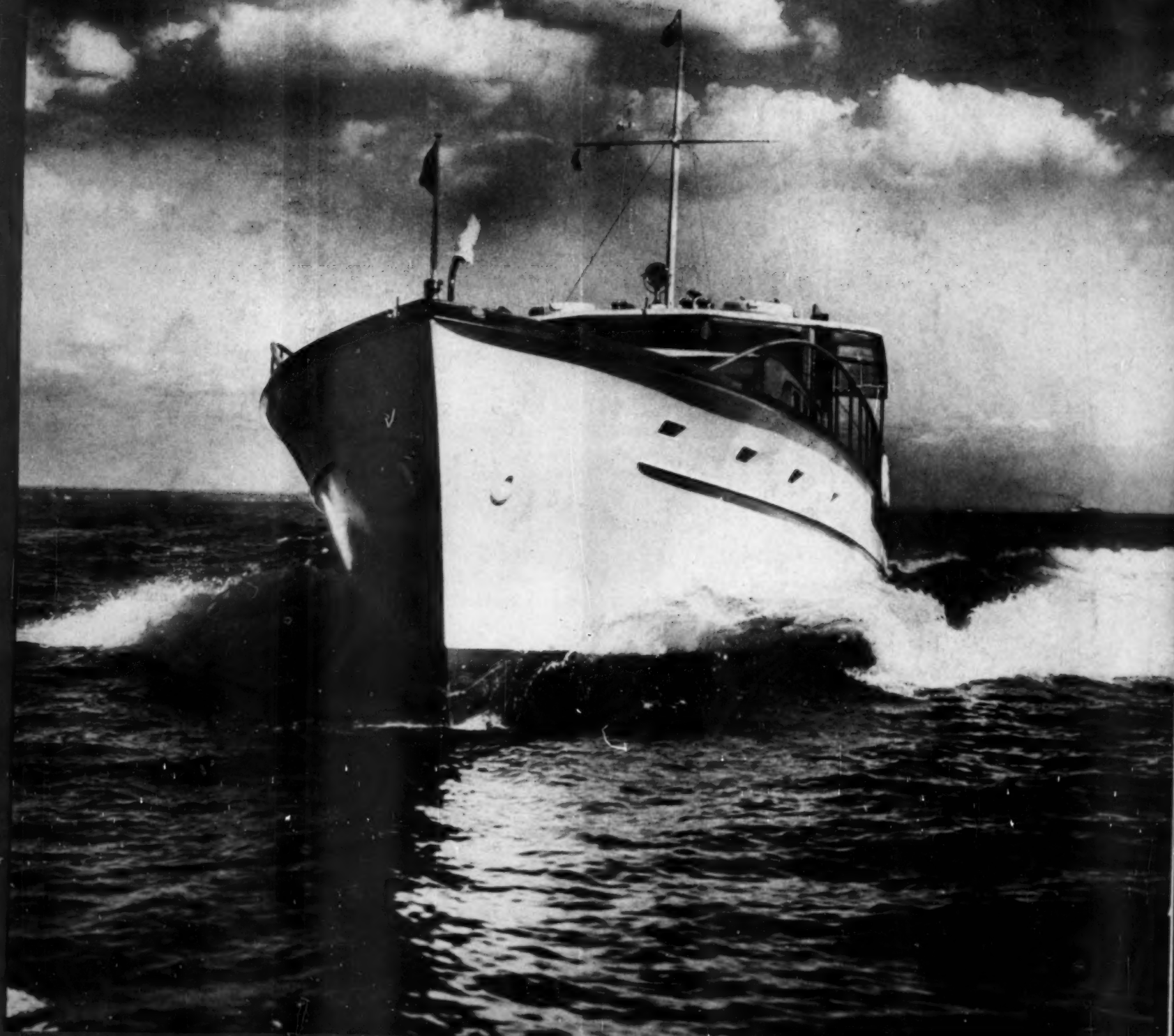


IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

# DIESEL PROGRESS

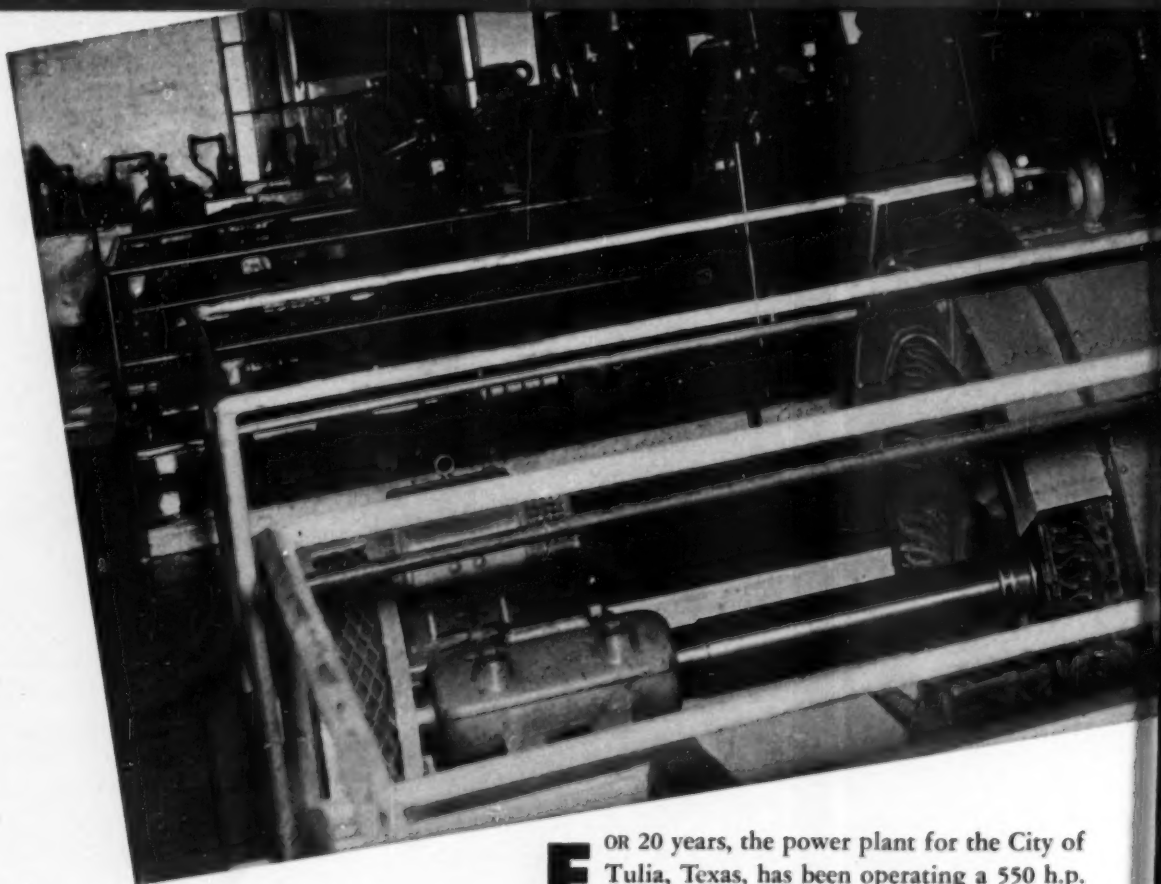


FIVE DOLLARS PER YEAR

JANUARY, 1953

FIFTY CENTS PER COPY

# IN 20 YEARS — NO STUCK RINGS



**F**OR 20 years, the power plant for the City of Tulia, Texas, has been operating a 550 h.p. Fairbanks-Morse Model VA Diesel — lubricated exclusively with one of the famous *Texaco Ursa Oils*. Never once has there been a stuck ring. Regular inspections and major overhauls have invariably found the engine exceptionally clean. Wear has been slight, maintenance costs very low. Thus, when the City of Tulia installed two new

TUNE IN . . . TEXACO  
STAR THEATER  
starring MILTON BERLE,  
on television  
Tuesday nights.  
METROPOLITAN OPERA  
radio broadcasts  
Saturday afternoons.



# TEXACO





## ... for Tulia, Texas, Diesels lubricated with Texaco Ursa Oil

Model 31 Fairbanks-Morse Diesels in 1949, it was only natural that the lubricant chosen should be *Texaco Ursa Oil*. All three engines are running perfectly.

There is a complete line of *Texaco Ursa Oils*. Whether you're operating Diesel, gas or dual-fuel engines, you can get a *Texaco Ursa Oil* exactly right to give you top performance at lowest possible operating cost. That is one reason why —

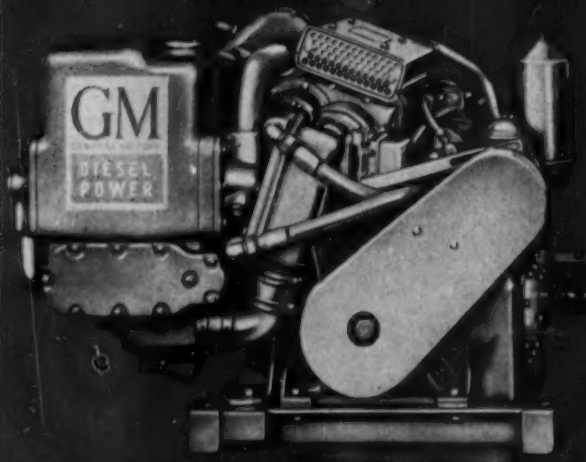
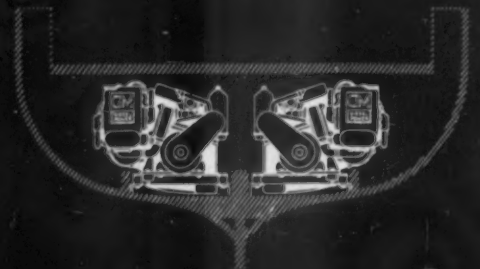
*For over 15 years, more stationary Diesel h.p. in the U. S. has been lubricated with Texaco than with any other brand.*

Let a Texaco Lubrication Engineer help you get greater efficiency and worthwhile savings from *your* operation. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

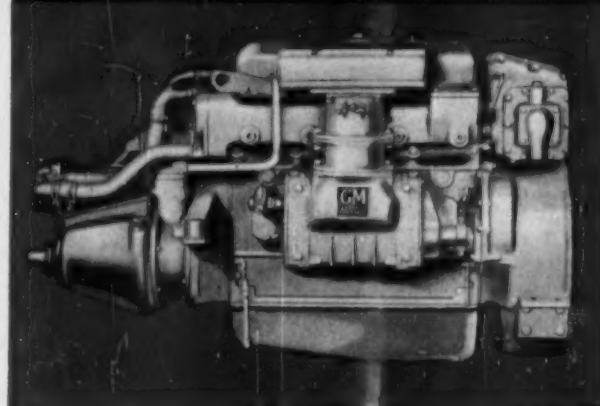
**URSA OILS** FOR ALL DIESEL, GAS  
AND DUAL-FUEL ENGINES

## NEW 4-71 INCLINED DIESEL

135 H.P. @ 1100 R.P.M. Features extraordinary compactness and light weight. Electro-Gas direct fuel injection system of the new GM inclined engine is similar to a conventional 200, resulting in the feature of vertical space. All engine loading reaction directly on top of the engine.



## NEW 4-51 MARINE DIESEL



**4-CYLINDER PROPULSION UNIT**—87 H.P. @ 3000 R.P.M. Over-all length, with direct drive and reverse gear, 49 1/4 inches. Over-all height, 31 inches. Total weight with complete equipment and gear, 1400 lbs. Here is Diesel power in its lightest, most compact form—engineered and built to deliver years of dependable, low-cost service in smaller work and pleasure boats.

## NEW 12 1/2 KW MARINE GENERATOR



**2-CYLINDER PERMANENT MAGNET GENERATOR SET**—AC 60-cycle. Over-all length, 37 1/2 inches. Total weight, 1200 lbs. Simplest, most compact Diesel unit of its capacity ever built. Driven by a 2-cylinder model of the new "51" Diesel, the generator has no bearings, exciter, commutator, brushes, slip rings, or costly regulating equipment.



# THREE NEW GM MARINE DIESELS FOR SMALLER BOATS

Detroit Diesel proudly introduces three great new GM Marine Diesel engines that bring Diesel safety, economy and dependability to a wider range of work and pleasure boats from 26 feet up.

The new 4-71 inclined engine packs extra power in a space-saving, weight-saving version of the famed GM Series 71 Marine Diesel that has become the standard of boatowners everywhere for efficient, economical Diesel power.

Height of the new inclined 4-71 has been reduced 9½ inches by tilting the block and head 70° from the vertical. And its weight has been reduced 500 pounds through extensive use of aluminum.

#### Now . . . a smaller Diesel

The new 4-51 propulsion unit is a smaller, lighter, high-speed, two-cycle Diesel that compares in size with gasoline engines of comparable power and speed, yet provides the Diesel's recognized advantage of doing more work on fewer gallons of safer, lower-cost fuel.

The amazing compactness of this new "51" engine has been achieved through new efficiency in engine breathing that develops both power and speed with a minimum of moving parts—*saving space and weight without sacrificing ruggedness*. Loop scavenging eliminates valves and valve mechanisms. A unique pneumatic governor has no rotating parts to wear or get out of adjustment. The oil pump is driven directly by the crankshaft, eliminating gear or chain drives.

A 2-cylinder model of this sensational new "51" engine drives a new 12½ KW permanent magnet generator. The set is so simple in design it requires no attention or

maintenance other than normal servicing of the engine. This compact new generator set—only 37 inches long—makes safe, low-cost electrical power possible even in small boats.

#### Extra safety—dependability—economy

Like all GM Marine Diesels, these rugged new engines give you the extra safety of less volatile fuel. They start at the push of a button on fuel oil alone. They burn only about half as many gallons of fuel as gasoline engines of comparable power. They cost less to maintain and are far more dependable than spark-ignition engines.

Yes, a whole new group of boatowners can now enjoy the speed, safety and smoothness *plus* the well-known economy of GM Diesel power. We invite you to inspect these great new General Motors Marine Diesel developments at the National Motor Boat Show. Write us or see your nearby GM Marine Diesel distributor for complete specifications.

*Single Engines . . . 16 to 275 H.P. Multiple Units . . . Up to 840 H.P.*



## DETROIT DIESEL

ENGINE DIVISION

General Motors • Detroit 28, Michigan

# Best Buy

## ...Here's Why!

Aeroquip Detachable, Re-usable Fittings reduce hose line inventory. For on-the-spot replacements cut bulk hose to required length and attach fittings.

Unique Fitting design provides quick, easy assembly and assures positive grip on hose. No adjusting is required after assembly.

Hose is constructed of seamless synthetic rubber compound reinforced with two cotton braids and a high tensile steel wire braid.

Wide range of male and female end fittings in all sizes meet practically every requirement. Fittings are designed to SAE and JIC specifications.

Tough, durable Aeroquip Hose Lines are fire resistant. They perform satisfactorily at extreme temperatures—from  $-40^{\circ}$  to  $+275^{\circ}$  F.

Aeroquip Hose Lines are widely used with hydraulic fluids, lubricants, water, gasoline, Diesel fuel, air, and many other fluids.



AEROQUIP FLEXIBLE HOSE LINES OUTSELL ALL OTHERS  
FOR INDUSTRIAL AND AIRCRAFT APPLICATIONS

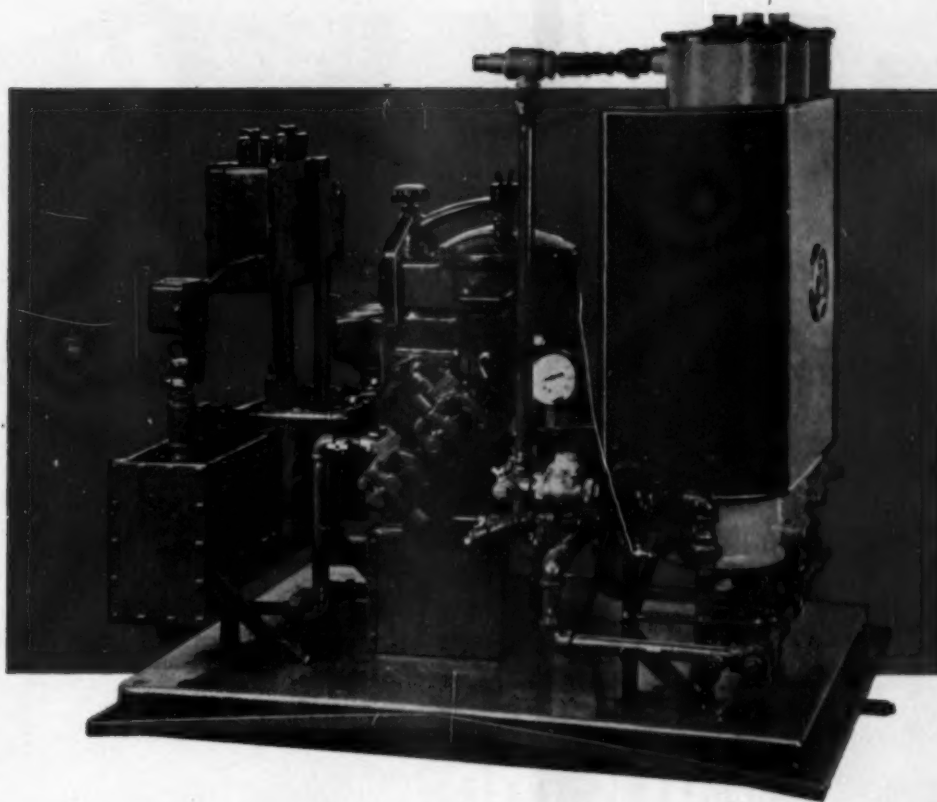
# Aeroquip

**AEROQUIP CORPORATION, JACKSON, MICHIGAN**

SALES OFFICES: BURBANK, CALIF. • DAYTON, OHIO • HAGERSTOWN, MD. • HIGH POINT, N. C. • MIAMI SPRINGS, FLA.  
MINNEAPOLIS, MINN. • PORTLAND, ORE. • WICHITA, KAN. • TORONTO, CANADA

AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD





## THE BEST INSURANCE YOU CAN GIVE YOUR ENGINE

The De Laval "Puri-Filter" enables the diesel operator to combine the advantages of purifying diesel lubricating oil by centrifugal force and by positive filtration. The centrifuge removes most of the solid impurities and all water, and the filters complete the cleaning operation and also restore the color.

The De Laval "Puri-Filter" is a combination of the De Laval "Uni-Matic" Oil Purifier and Fram Filcron Filters.

The unit is supplied complete with dirty-oil and clean-oil pumps, and is piped ready to operate. Electrical controls are provided, and all parts are compactly mounted on a sturdy metal base.

With the De Laval "Puri-Filter," diesel lubricating oil can be maintained truly *clean* and *dry*—the maximum in protection for any engine!

Ask for Bulletin DL-1.

THE DE LAVAL SEPARATOR COMPANY  
Poughkeepsie, New York 427 Randolph St., Chicago 6

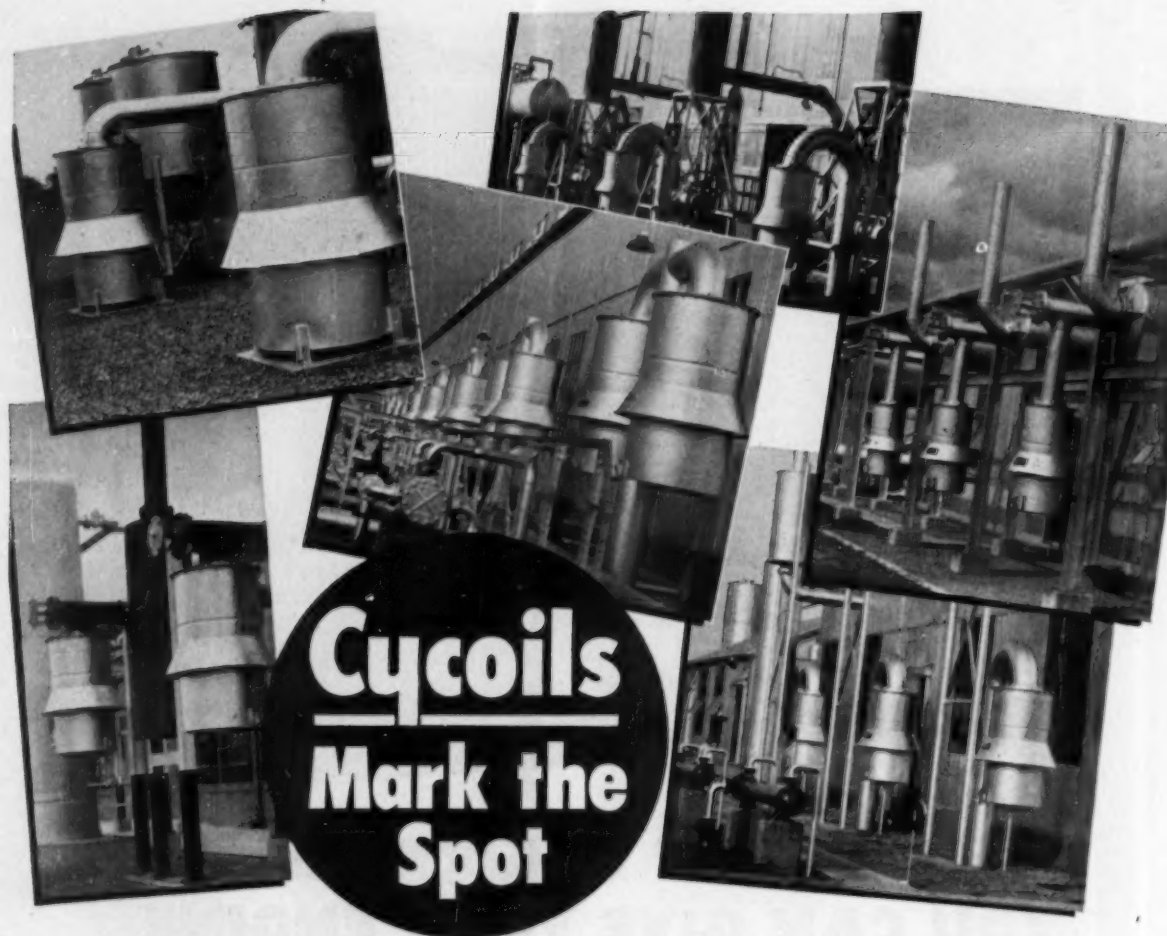


DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5  
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

# DE LAVAL

## OIL PURIFIERS

● FOR DIESEL LUBRICATING OIL ●



## Cycoils Mark the Spot

### Where Engines and Compressors Enjoy Complete Dust Protection

Such spots are numbered by the hundreds. Nor are all of them confined to the "dust bowl" areas of the nation. Find a cost-minded management that recognizes how dust damage contributes to engine down-time and repairs and you'll find dependable Cycoil Oil Bath Air Cleaners on the job.

What's the secret of Cycoil's industry-wide acceptance? They're designed to fight for every particle of dust. Thorough mixing of oil with

the intake air at the start results in over 90% of the dust content being trapped before it even reaches the Cycoil's filter pads. Then comes the final cleaning action of the filter pads for removal of the remaining 10%. Net result—approximately 100% clean air.

Why not get a firsthand report from the folks who really keep a running score on Cycoil performance? Write us today for list of representative users and complete Cycoil data.



**American Air Filter**  
COMPANY, INC.

408 Central Avenue, Louisville 8, Kentucky • American Air Filter of Canada, Ltd., Montreal, P. Q.



# **P&H Diesel Engines**

(2-CYCLE)



*Can your diesels  
match this  
torque curve?*

This is the torque curve for the P&H Model 687-C Diesel Engine. Note how the torque characteristics are sustained throughout its entire horsepower range.

That means steady, responsive power at all speeds — greater lugging "ability" for those toughest jobs. It's the kind of unfaltering performance that assures more profits in any service, constant or intermittent.

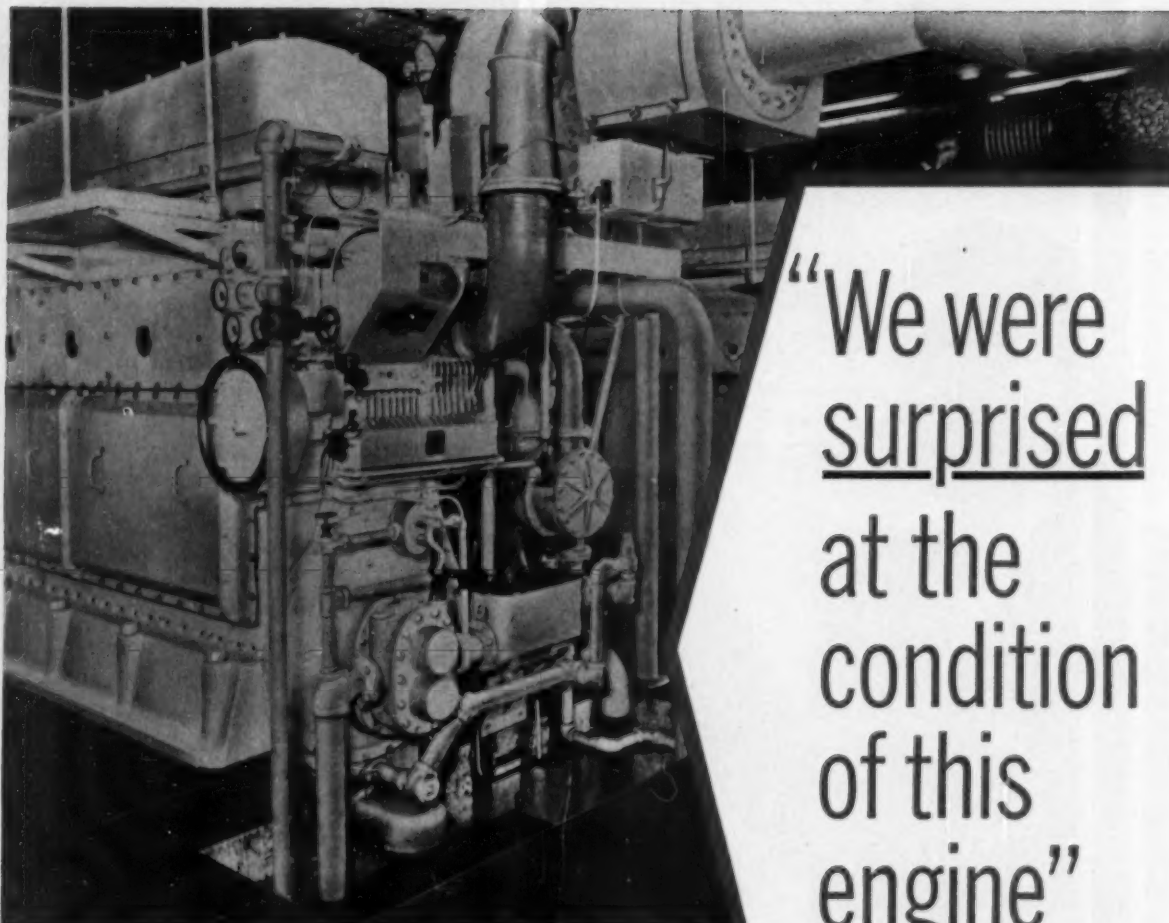
Steady torque for steady work is just another outstanding feature of P&H Diesel Engines — America's most advanced line. Ask your P&H Diesel representative for the full story. Or write for literature.



P&H Diesel Engines are built in 1, 2, 3, 4 and 6-cylinder models — up to 145 h.p.

**P&H DIESEL DIVISION**  
HARNISCHFEGER CORPORATION  
CRYSTAL LAKE, ILLINOIS





"We were  
surprised  
at the  
condition  
of this  
engine"

... says G. V. Yarger,  
Supt. Municipal Utilities  
Waverly, Iowa

"When we finally opened up our Worthington, it was in the *best* condition I've ever seen a diesel engine that had operated such long hours and under such heavy loads as this unit. It had a total of 48,926 hours on it — 8,987 hours of tough operation since the last overhaul.

Mr. Yarger continues, "We've been using Sinclair RUBILENE® Heavy in the crankcase and RUBILENE H.D. 30 in the cylinder lubricator. These RUBILENES have kept the crankcase and upper portions of the cylinders exceptionally clean and bright, with no sign of carbon or deposits."

That's a typical report on the exceptional qualities of the Sinclair RUBILENES... evidence that they could improve the efficiency of *your* diesels, too. Why not switch now? Contact your nearest Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

**SINCLAIR DIESEL OILS**  
save wear and replacements

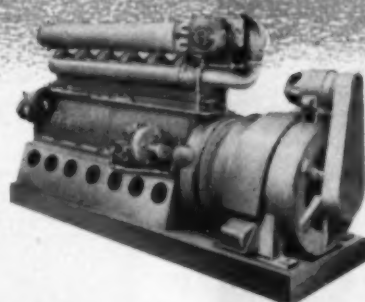


# Choose the Finest in Diesel and Dual Fuel Power **ENTERPRISE**

QUALITY BUILT FOR CONTINUOUS, HEAVY-DUTY SERVICE

**MORE**  
for your  
Power  
Dollar

Enterprise Diesel and Dual Fuel Engines are providing maximum efficiency at lowest cost in every type of stationary service — utility plant, municipal power, REA co-op, sewage disposal and a host of industrial applications. Typical units shown here are representative of the complete Enterprise 4-cycle line, built in 3, 4, 6 and 8 cylinder models, ranging from 68 to 2056 HP — generator sets to 1402 KW. To get the most for your power dollar, get the facts on Enterprise today.

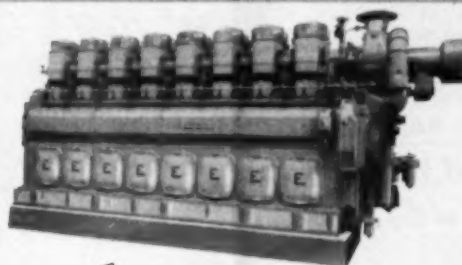
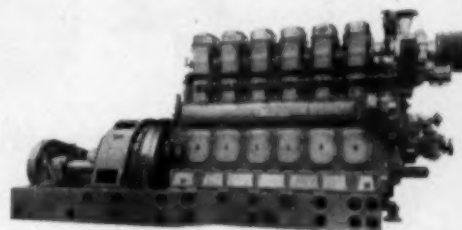


**MODEL DSM-36**

Enterprise M Series Diesels are built in 3, 4 and 6 cylinder models, 8" bore x 10" stroke. Turbocharging is available on 6 cylinder engine, as shown at left. Ratings in this series range from 68-400 HP at 450-800 RPM.

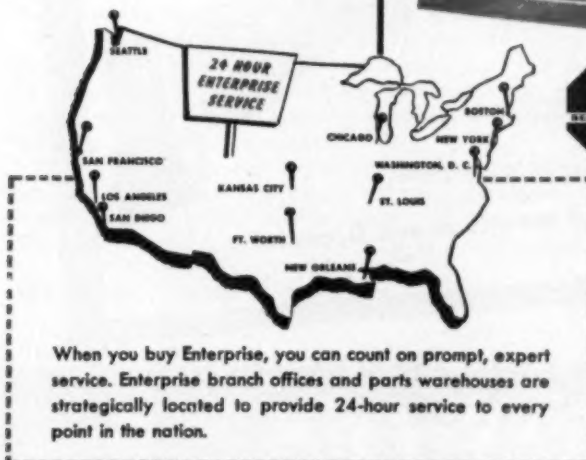
**MODEL DSG-36**

Series G Diesels, in 6 and 8 cylinders, furnish slow speed, heavy-duty power in a wide-variety of services. Designed with 12" bore x 15" stroke, this series is rated 273-1388 HP at 250-600 RPM. Turbocharging available on all models.



**MODEL DSQ-38**

Largest in the Enterprise line, Series Q Diesels are built in 6 and 8 cylinder models, 16" bore x 20" stroke, normally aspirated and turbocharged. Conservatively rated 647-2056 HP at 250-375 RPM.



When you buy Enterprise, you can count on prompt, expert service. Enterprise branch offices and parts warehouses are strategically located to provide 24-hour service to every point in the nation.



**Enterprise**  
DEPENDABLE  
**Diesels**

**ENTERPRISE ENGINE & MACHINERY CO.**

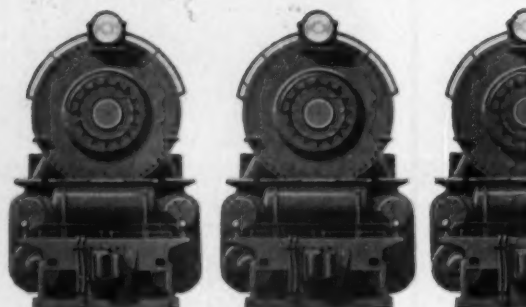
A Subsidiary of General Motors Corporation  
18th & Florida Sts., San Francisco 10, Calif.

# ONE



**General Motors Diesel freight locomotive  
does as much work per year as**

# 2½



**steam locomotives—because it hauls more  
tons faster and spends less time in the shop**

*but that's only half the story—*

**One-fifth ounce of fuel oil hauls  
one ton of freight one mile when  
burned in a General Motors Diesel  
locomotive**

—five times as far as the same amount of fuel  
in an oil-burning steam locomotive



**To conserve fuel**

**AND GET MORE WORK DONE**

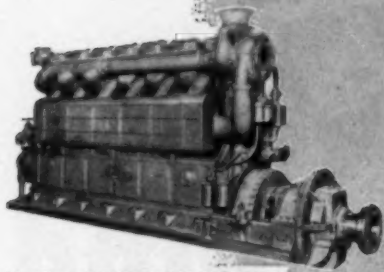
**America needs more Diesels!**

**ELECTRO-MOTIVE DIVISION  
GENERAL MOTORS**

LA GRANGE, ILLINOIS • In Canada: GENERAL MOTORS DIESEL, LTD., LONDON, ONTARIO



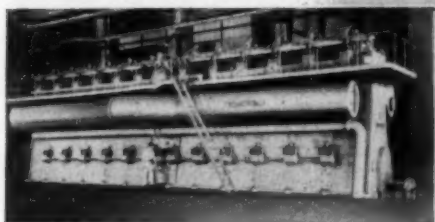
FOR THE BEST SOLUTION TO YOUR POWER PROBLEMS...



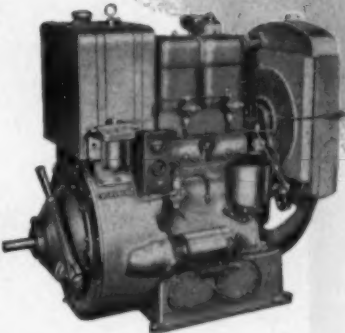
The Nordberg SUPAIRTHERMAL Engine, —outstanding development in the Diesel field, is available in a complete range of 4-cycle types for all applications, in sizes from 535 to 4270 H.P.—including Diesel, Dualfuel, or spark fired gas operation.

# LOOK TO NORDBERG

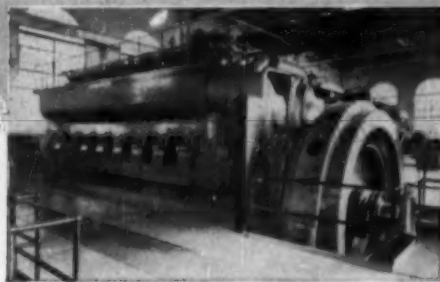
—builders of America's largest line of  
**HEAVY DUTY DIESEL ENGINES—**  
**10 TO MORE THAN 10,000**  
**HORSEPOWER**



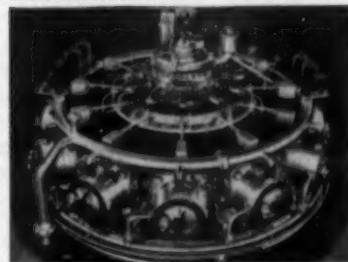
Nordberg 2-cycle Diesels for Marine or stationary service are built in a wide range of types and sizes, from 1570 to 10,800 H.P.



Nordberg "Packaged" Diesel Power Units —from 10 to 45 H.P., 6 to 30 K.W., for generating electricity, pumping, and straight power applications.



Nordberg 2-cycle Dualfuel engines are built in a wide range of sizes from 1570 H.P. upward —all of which burn oil, gas, or any combination of both—and are instantaneously convertible from one fuel to another, under full load.



Nordberg 2-cycle Radial engines develop 1950 to 2125 H.P. or 1250 to 1500 K.W. at 400 R.P.M., as an oil burning Diesel, as a gas engine, and as a Dualfuel engine.

P-SHA152-R

**I**N the complete line of Nordberg two and four-cycle oil burning and Dualfuel Diesels and gas burning engines, you will find the right size and type of unit to meet your power requirements.

From the smallest to the largest engine, every Nordberg unit is built to deliver low-cost, dependable power . . . and the basic dependability of Nordberg engines has been amply proved in service on hundreds of successful stationary and marine power applications all over the world.

If you're planning on adding to your present power capacity, or providing new power facilities, it will pay you to investigate the long life and dependable service you get with Nordberg Engines. Write for further details, outlining your power requirements.

**NORDBERG MFG. CO., Milwaukee, Wisconsin**



A DIVISION OF NORDBERG

## NORDBERG

### DIESEL ENGINES



# Strip Act Goes Underground



**TOPS FOR TIGHT PLACES.** This compact International TD-9 and loader combination is a natural for work in close quarters.

## International TD-9 loads 600 tons of shot rock daily for Missouri quarry

Two years ago, Rock Acres Development Company, Independence, Missouri, was a stripping operation.

Today, they're quarrying underground, with a yearly production of 120,000 tons of agricultural limestone and road stone.

Star performer is an International TD-9, equipped with a dozer shovel. In this underground operation, the TD-9 loads as high as 600 tons of shot rock daily . . . works an area 600 feet wide and 700 feet back.

"Our TD-9 is a real money maker," says Superintendent Norman Searcy. "Maneuverability is the reason we can load so much—and the upkeep costs are very low."

Above ground or below, International power is always a money-maker in quarry operations. Your International Industrial Distributor has facts and figures to back up this statement with actual performance records. See him for the real low-down on International "power that pays."

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL



POWER  
THAT  
PAYS



# THE ENGINEER'S REPORT

PRODUCT	Chevron Starting Fluid
UNITS	Diesel engines
CONDITIONS	Sub-zero temperatures
EQUIPMENT	Permanent dash-mounted primers— bulk storage tanks
FIRM	Picco Logging Co., Montesano, Wash.

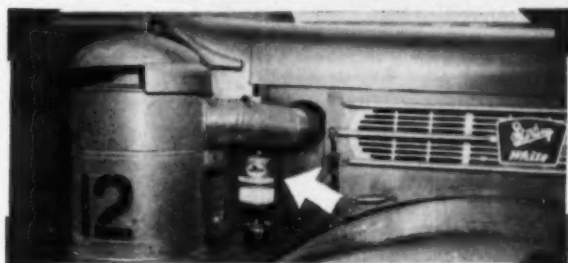
## Diesels start instantly at 20° below zero!



PRIMED WITH CHEVRON STARTING FLUID, diesel engines in Picco Logging Co. trucks "start instantly, even in winter temperatures that sometimes reach 15° and 20° below zero," according to E. W. Picco, owner. Previously, the company lost from 10 minutes to an



hour a day in starting each truck. And often, when left out overnight, trucks had to be towed before they would start. The dash-mounted pump shown above is worked once or twice as the engine turns over, forcing fluid through atomizers into manifold.



MOUNTED NEAR THE ENGINE, this storage tank holds bulk Chevron Starting Fluid. It is also available in 7- and 17-CC gelatin capsules. These capsules are placed in a puncturing tool, and fluid is pumped into intake manifold the same way as from the central bulk tank shown. Each type of dispensing equipment is suitable for both diesel and gasoline engine and is available from your starting fluid supplier. Chevron Starting Fluid is approved by leading engine manufacturers.

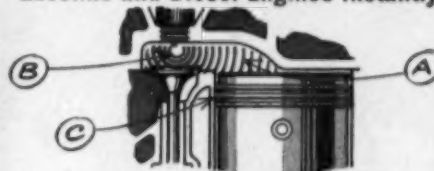


FREE BOOKLET gives you more facts on Chevron Starting Fluid—shows where it should be applied in different type engines. Write or ask for it today.



TRADEMARK REG. U.S. PAT. OFF.

### How CHEVRON Starting Fluid Starts Gasoline and Diesel Engines Instantly



- Atomizes in lowest temperatures and provides powerful, easily ignited vapor in combustion chamber.
- Pressure, or the weakest spark, fires mixture—turns engine and heats air for regular fuel mixture.
- Contains lubricant and additives—inhibits cylinder wear, and ice formation in primer equipment.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

STANDARD OIL COMPANY OF CALIFORNIA • San Francisco 20  
THE CALIFORNIA OIL COMPANY • Barber, New Jersey

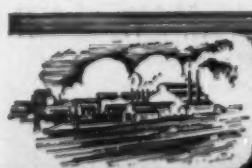
STANDARD OIL COMPANY OF TEXAS • El Paso  
THE CALIFORNIA COMPANY • Denver 1, Colorado

# An Unusual Combination ~

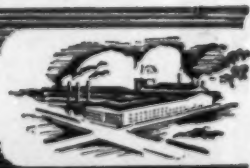
**PRECISION  
CRAFTSMANSHIP  
In VOLUME  
PRODUCTION!**



**H**ERE at Erie Forge we like to call ourselves specialists . . . specialists in precision forging and machining. We believe in "One Control—One Responsibility". Here under one roof we control every step in the production of the finished product from the raw material to the finished crank. Design, metallurgical control, casting, heat treating, forging and machining are under the watchful supervision of fine craftsmen with many years of experience. Consult with us on your next requirements for crankshafts, connecting rods or allied items.

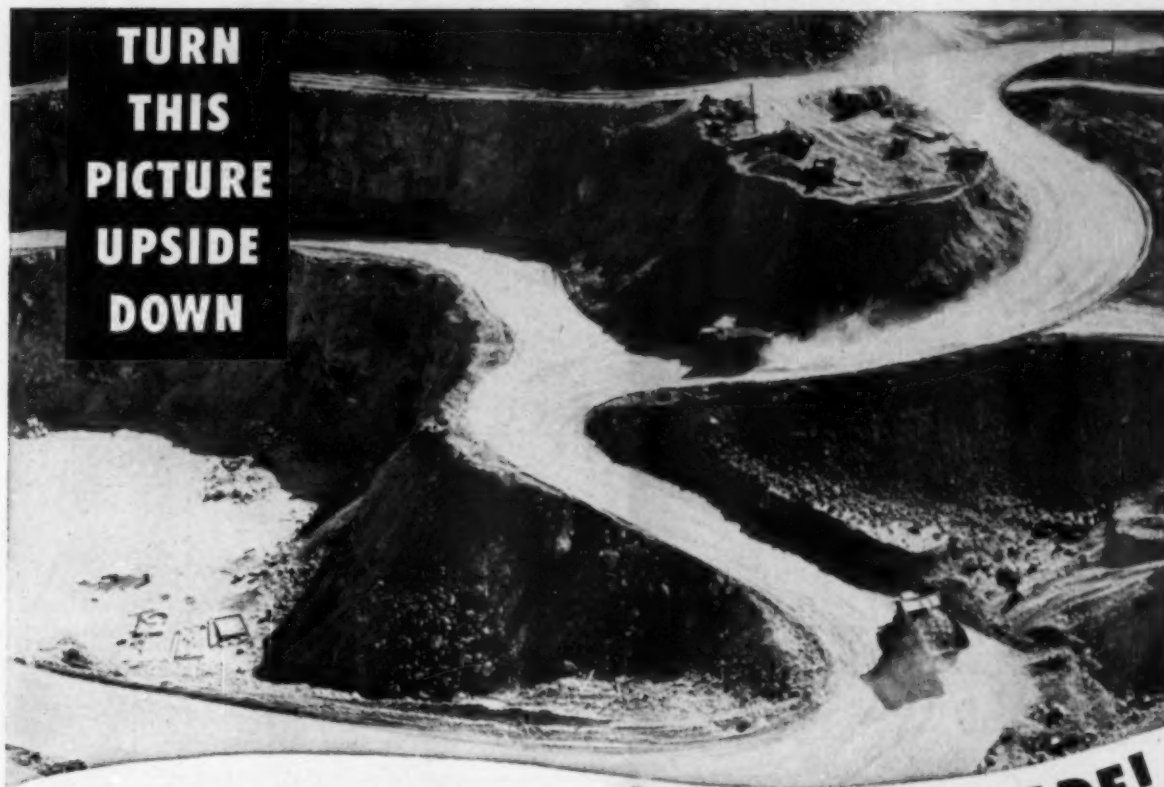


**ERIE FORGE & STEEL CORPORATION**  
ERIE, PENNSYLVANIA





**TURN  
THIS  
PICTURE  
UPSIDE  
DOWN**



**Any way you look at it... IT'S A TOUGH GRADE!**

**yet BIG BUDA diesels  
are cutting haulage  
costs every day!**

**8-DAS-1125 350 HP at 2100 RPM**



**Whatever your power requirements, there's a money-making Buda dyna-swirl Diesel to fit your needs. See your nearby Buda Distributor today. Write for Bulletins and data. The Buda Company, Harvey, Ill.**

Manufacturers of Diesel and Gasoline Engines, Maintenance of Way Products, Lifting Jacks, Earth Drills and Material Handling Equipment

14 Buda-powered haulage units are roaring up this tough grade . . . 2/10 of a mile with 5 switchback turns . . . hauling payloads up to 22 tons in faster time at a considerable reduction of their former cost.

The extra horsepower and 13 to 25% more displacement . . . greater lugging ability with 9 to 23% more torque of BIG Buda Diesels is paying off at this Bagdad Copper Corp. pit in higher production and lower costs. In many instances, the Budas are going more than 6000 hrs. before overhaul—another factor in lowered costs.



Buda powered Dart dumping at the crusher.

BC-18

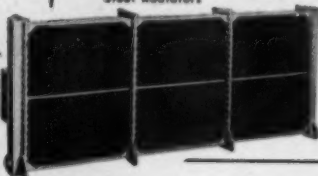
**BUDA**

# YOUNG *All the Way!*

## DIESEL LOCOMOTIVE COOLING

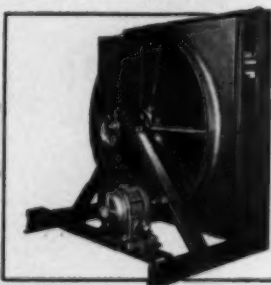
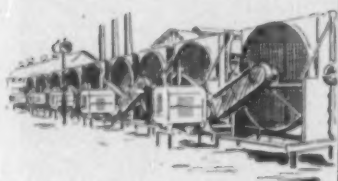


Removable and Fixed Tube Bundle, Shell and Tube Heat Exchangers  
"MONO-WELD"  
Heavy-Duty Steel Radiators



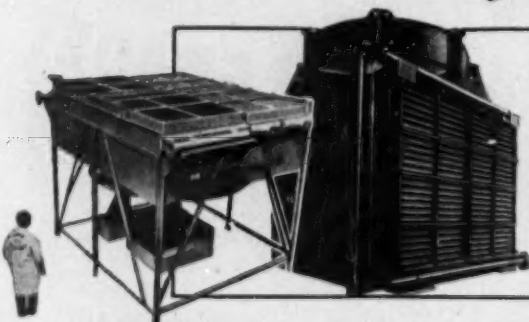
The combination of Young "MONO-WELD" radiators and heat exchangers offers heat transfer equipment that combines to provide proper, efficient cooling. "MONO-WELD" construction insures long life with steel single unit tanks, steel side members, and proper core selection. Young heat exchangers give maximum heat transfer per unit volume, with minimum weight.

## GAS, GASOLINE, DIESEL ENGINE FLUID COOLING



Young "FULL FLOW" and "STANDARD SERIES" Jacket Water Coolers

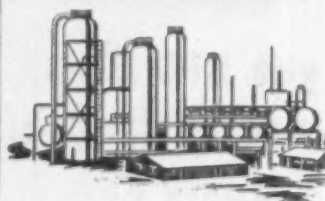
Young units offer a complete variety of cooling surfaces, compact, rugged design, welded steel construction. Vertical water flow, steel channel side members, steel side supports for cores, press-formed heavyweight non-ferrous headers, complete accessories, versatility of components to meet all requirements.



Young "HC" (left) and "VAD" Vertical Air Discharge Units

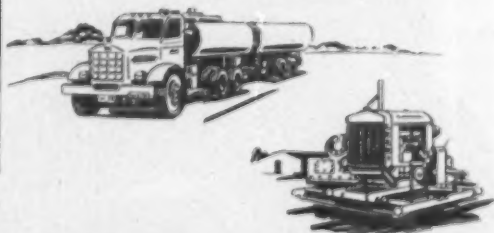
These units offer vertical air discharge—not affected by wind direction—efficient operation, full size plenum chambers, efficient air handling equipment, simple rugged structure of frame and metal work, proper heat transfer surface for any application required.

## GAS, GASOLINE, DIESEL ENGINE FLUID COOLING AND CONDENSING



Requirements for jacket water, lube oil, torque converter or other specialized cooling may be met with the wide range of radiators and other products manufactured by Young. To fit specific requirements, use of proper materials, surfaces and accessories provide maximum heat transfer per unit volume of available space with minimum weight.

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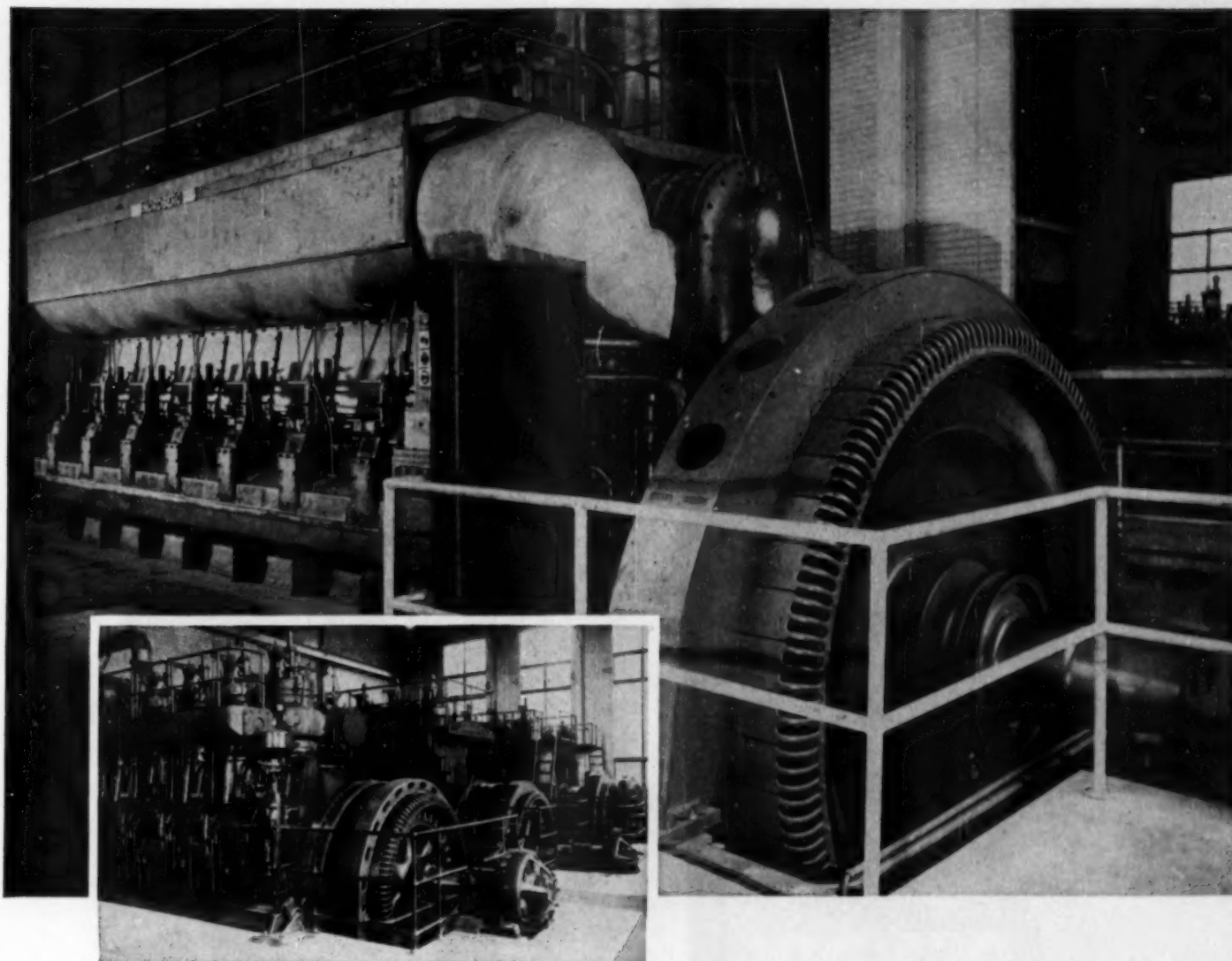
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## Rensselaer, Indiana, plant gets record economy with...

● Shown above are the five diesel engines, totaling 7,150 hp., which make the Rensselaer municipal plant one of the largest of its kind in Indiana. The efficient operation of these diesels has helped keep Rensselaer's lighting rates among the lowest in the state for cities in the 2,500 to 10,000 population group.

Contributing to this successful record, Standard Oil's diesel fuel and lubricants have helped keep operating and maintenance costs low. STANDARD HD Oil has played a particularly important role. This outstanding heavy-duty lubricant has provided effective lubrication of vital cylinder areas. It has kept cylinders and rings protected against excessive wear and free from deposits. How these benefits contribute to high operating efficiency is shown by the performance of the plant's newest and largest diesel, a 2,800-hp unit. In a typical month, this unit has operated for 444 hours, carried an average load of 54%, and generated 13 kw-hr per gallon of fuel with a lubricant consumption rate of 9.414 hp-hr per gallon.

Throughout the Midwest, diesel operators are getting record efficiency and economy with the help of STANDARD HD OH. The Standard Oil lubrication specialist in your area will be glad to give you information concerning the use of this superior heavy-duty lubricant in plants with which you may be familiar. Just phone your local Standard Oil Company office for his services. Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Illinois.

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# Commerce Cuts Costs

**Texas Power Plant  
Reduces Fuel Costs 72%**

*with* **NORDBERG  
DUA FUEL ENGINE**



*and*  
**BENDIX**

**FUEL INJECTION  
EQUIPMENT**



The Municipal power plant at Commerce, Texas, an attractive city of 6000 population about 70 miles northeast of Dallas, faced a two-fold problem. Load capacities were increasing sharply and costs of power production with oil burning engines were high.

To provide the additional capacity required, and at the same time take advantage of available low cost natural gas, the city installed a 1200 h.p. Nordberg supercharged dual fuel engine with Bendix Fuel Injection equipment. Fuel costs then dropped to 2.70 mills a kilowatt hour or better than 72%, a saving of over \$11,000 in the first six months.

More and more cost conscious operators are installing Bendix equipped diesel power plants because Bendix is long experienced in working with diesel manufacturers in achieving maximum performance with low operating costs.

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**165,000** hours of service  
 completed by **28 Alco Diesels**  
 at **98½%** availability

**for Gulf Refining Company**

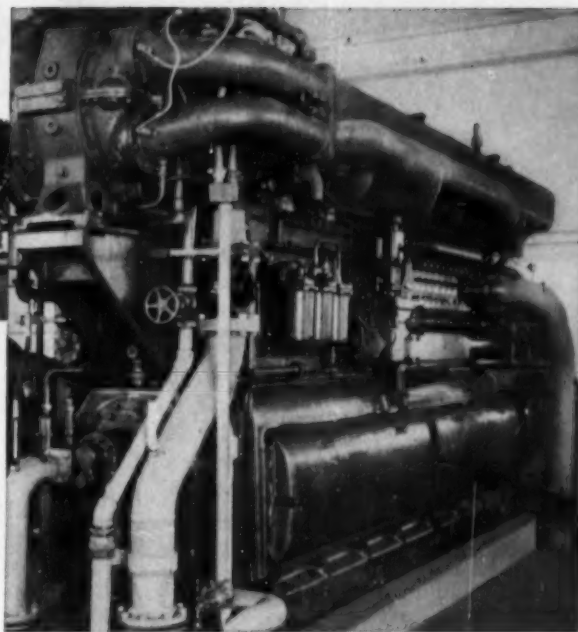


Twenty-two years ago, Gulf Refining Company installed 28 Alco Diesel Engines on its new, 700-mile Tulsa-to-Spencerville Junction pipeline. Today, those 28 Alco Diesels have completed more than 165,000 hours of service and are operating at 98½% availability. And since 1941, when the output of the line was greatly increased, they have been in actual service an average of 97% of the time.

Pumping station superintendents throughout the United States and Canada specify Alco Standardized Diesels because of this kind of *proved* dependability—and because of these economy features:

- **Compactness**—for lower construction costs
- **Higher Engine Efficiency**—for lower fuel costs
- **Medium Speed**—for lower auxiliary equipment costs
- **Flexible Power Range**—for lower expansion costs

For the complete story on Alco Diesel Engines, contact your nearest American Locomotive Company Sales Office. You will find them in New York, Beaumont, Chicago, Cleveland, Houston, Kansas City, San Francisco, Schenectady and St. Louis.

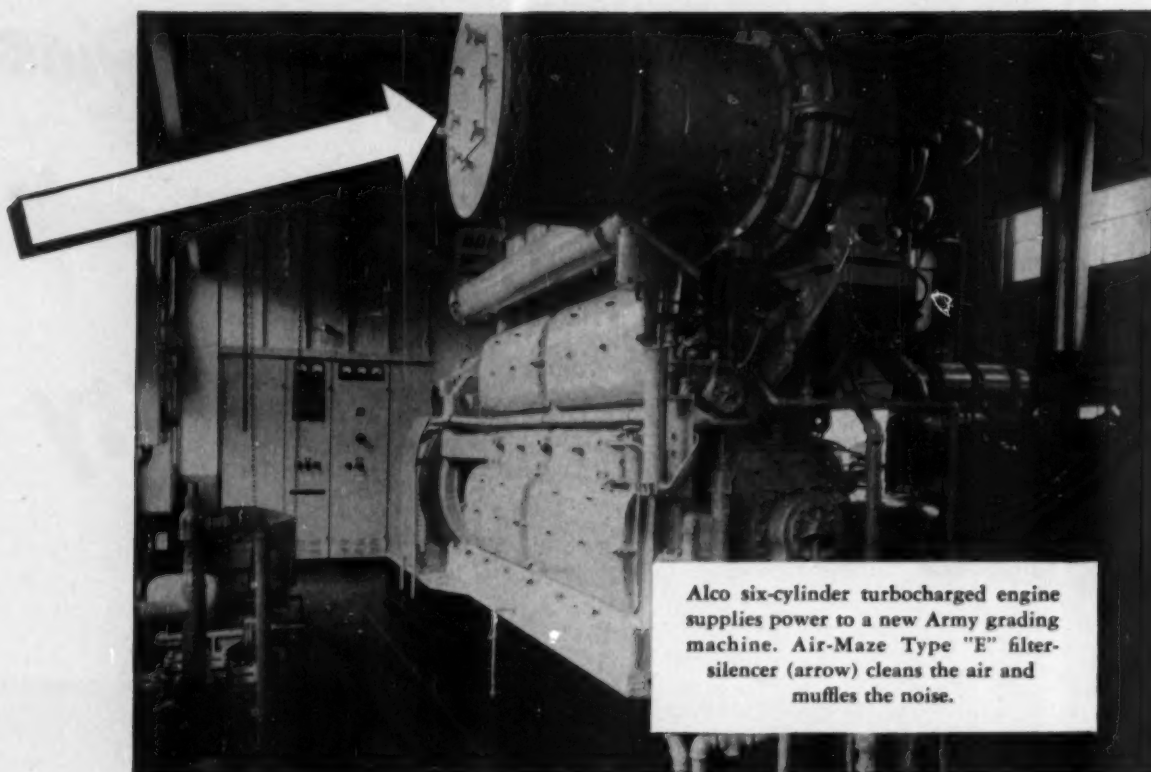


**ALCO DIESELS**



THE MARK OF MODERN ENGINEERING

AMERICAN LOCOMOTIVE COMPANY



Alco six-cylinder turbocharged engine supplies power to a new Army grading machine. Air-Maze Type "E" filter-silencer (arrow) cleans the air and muffles the noise.

## Air-Maze filter-silencer cuts wear, muffles noise of Alco diesels on Army grading machines

**T**HE FIRST TWO diesel-electric grading machines of the Memphis District, U. S. Army Corps of Engineers, were put into service recently on the lower Mississippi River. The machines are used to grade banks of the river prior to the placing of revetments.

The grading machine generators are driven by Alco six-cylinder turbocharged engines located on companion mooring barges. To muffle annoying intake air noise and keep damaging dust out of the engines' highly polished moving parts, Alco engineers specified Air-Maze Type "E" filter-silencers.

They have a specially designed acoustical chamber which dampens air intake noise. A permanent, cleanable filtering element keeps out dust and dirt. Wear is reduced, overhaul costs cut.

Air-Maze filters and filter-silencers are available in a wide range of designs, including oil-bath as well as cylindrical and flat panel types.

For help with your filter problems contact your nearby Air-Maze representative or write Air-Maze Corporation, Cleveland 5, Ohio.

*The biggest names in diesels are protected by Air-Maze filters*

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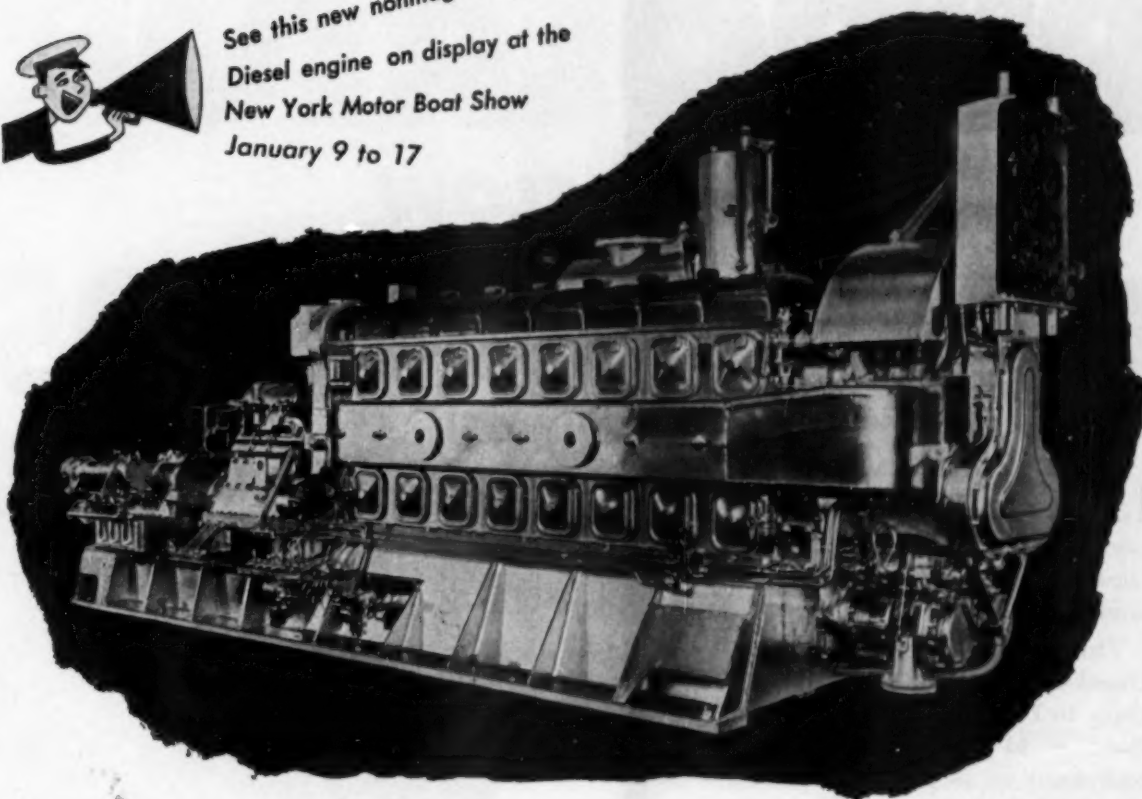


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January 9 to 17



Here you see the first nonmagnetic Diesel engine ever built for U. S. Navy minesweepers. Developed and built by Cleveland Diesel Engine Division of General Motors for U. S. Navy, it will provide efficient, reliable power that lessens the danger to crews and ships from magnetic mines.



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A leading Diesel manufacturer reports:

We were getting bearing failure in 100 hours  
... until we standardized on

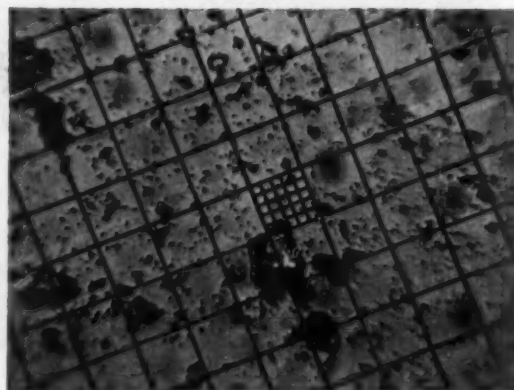
# **PUROLATOR**

## **FULL-FLOW**

# **MICRONIC FILTERS**

**I**N SERVICE SO SEVERE that engine bearings formerly failed in a hundred hours or less—the same Diesel equipment now operates more than a thousand hours with no visible bearing wear!

This enormous increase in bearing life—this Diesel manufacturer reports—can be credited entirely to Purolator Full-Flow Micronic\* filtration. Needless to say, Purolators are now standard equipment on *all* this manufacturer's Diesel vehicles and industrial engines!



The Purolator® Micronic element traps dirt down to submicrons in size, and has many times more dirt storage space than old-style filters.

Not once . . . not twice . . . but every time Purolators have been tested by the world's largest and most important makers of internal combustion engines—Purolators have won top honors. No other filter is capable of delivering the high flow rates necessary for filtering *all* the oil at each pass—full-flow filtration—with minimum pressure drop throughout a lengthy service life. And no other filter gives dependable filtra-

tion down to submicrons (.0000039 in.)! The Micronic element has *ten times* the effective filtering area of old-style filters. And—size for size—no other filter provides as much dirt storage space as does Purolator.

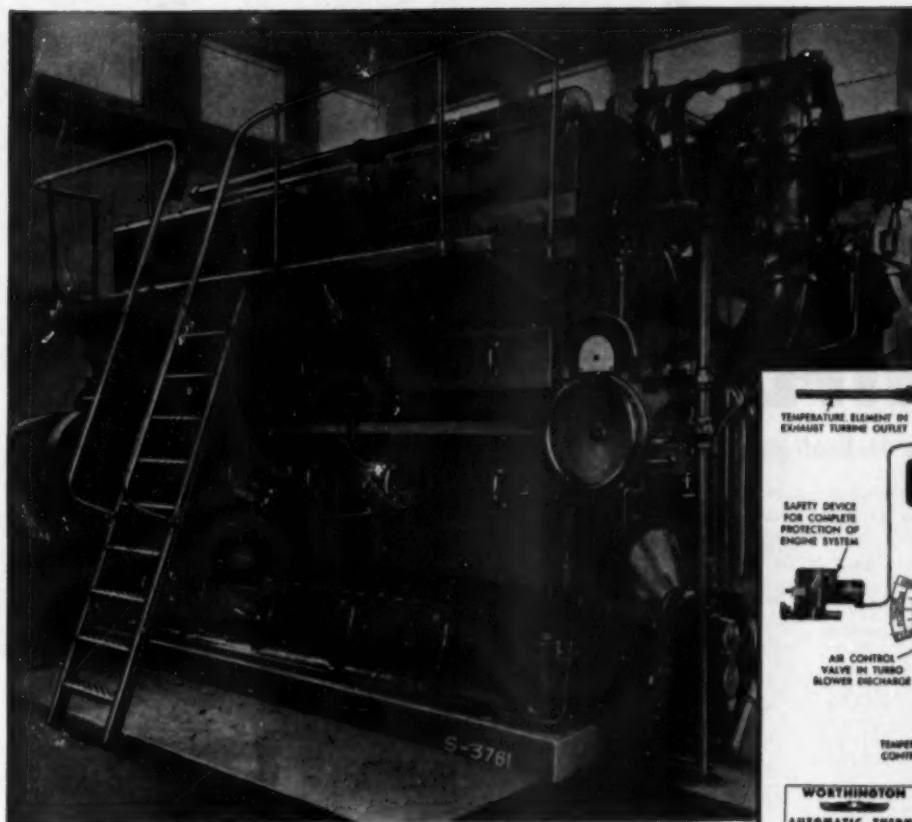
Want to prove Purolator's outstanding superiority to your own satisfaction . . . on your own equipment . . . in your own way? Our Engineering Department will gladly co-operate in helping you

conduct any type of comparative filter test you may prefer. Simply write, describing your equipment. \*Reg. U.S. Pat. Off.

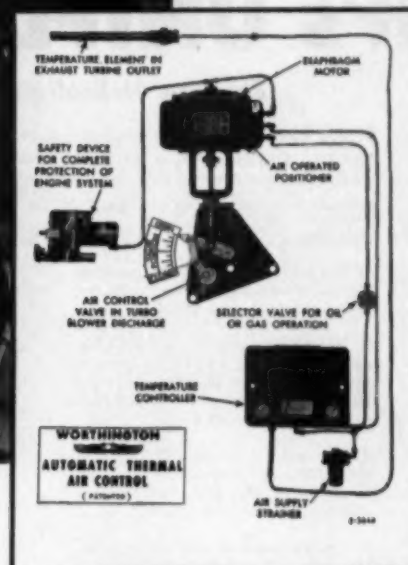
PUROLATOR PRODUCTS, INC.  
Rahway, New Jersey and Toronto, Ontario, Canada  
Factory Branch Offices: Chicago, Detroit, Los Angeles







HANDLING INCREASING LOADS at the Vermillion, S. D., municipal power plant is this Worthington converted 840-kw dual fuel Diesel engine.



WORTHINGTON AUTOMATIC THERMAL AIR CONTROL supplies correct air-fuel ratio to the engine cylinders at all times and in direct relation to all load changes.

## Vermillion, South Dakota, meets new power demands

In 1949, the City of Vermillion, South Dakota, was faced with the necessity of meeting increased electrical load requirements on its municipal power plant.

To solve this problem, Vermillion plant engineers decided to have their Worthington EE-6 Diesel engine, installed in 1937, converted to a more powerful unit.

Worthington engineered the change-over of the 500-kw naturally aspirated oil Diesel to an 840-kw supercharged dual fuel Diesel—an increase of 340 kw. Engine speed was raised from 327 to 360 rpm.

Now, after a year and a half of heavy-duty operation, the Worthington converted engine has proved to be the most efficient and reliable power producer in the Vermillion plant.

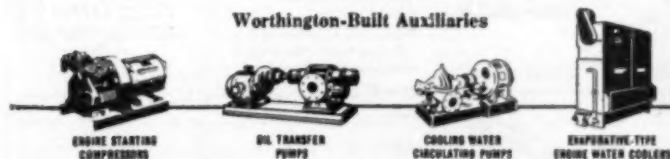
Four of the many exclusive Worthington features that insure top performance of Worthington dual fuel engines are:

1. Worthington automatic thermal air control for improved fuel economy.
2. Worthington dual plunger fuel pump for better, quieter combustion.
3. Worthington micro-metering gas valves—one for each cylinder—for equal cylinder loading and better speed regulation.
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Worthington Corporation, Engine Division, Buffalo, New York.

E. J. S.

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Economical Continuous Power—Diesels, Oil and Dual Fuel, and Spark-Ignition Gas Engines, from 150 to 2100 bhp.



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**The new Helically-corrugated Seamless Flexible Tube**

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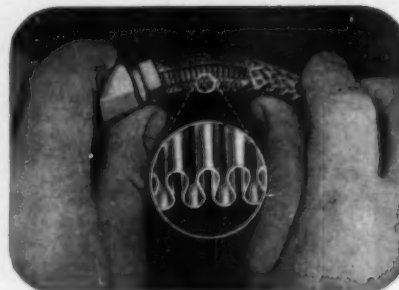
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1. We make UNIFLEX from seamless, special bronze alloy tube—tough, corrosion-resistant, leak-proof.
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4. Unlike conventional split-ring collars used on concentric tubing, the *one-piece* UNIFLEX collar hugs 4 or 5 convolutions. This means far less wear—and much greater strength in the connection.
5. UNIFLEX is encased in high-tensile bronze wire braid attached to specially designed couplings. Hose is relieved of damaging strains; sheath prevents elongation, gives extra safety, withstands abrasion.
6. UNIFLEX helical construction distributes flexing between inner and outer surfaces of convolutions—eliminates strain usually limited to one groove. Result: Greater safety and longer life.
7. UNIFLEX fittings are shorter and more compact than most others. This permits the use of more hose length and less fitting length—gives far greater maneuverability, makes it easier to get in and out of tight places.

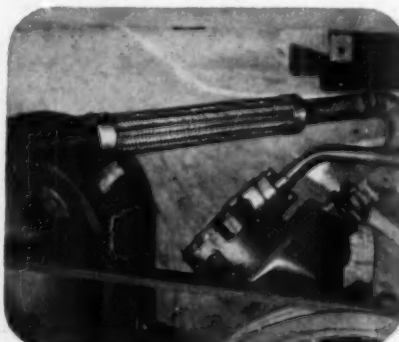
UNIFLEX is supplied in measured lengths, properly fitted and ready for use. You can buy it in sizes from  $\frac{1}{4}$ " to 6" ID. It has already proved itself in such applications as hydraulic lines, oil burners, refrigeration machinery, air conditioning equipment, pumps, compressors, diesel engines and machine tools. Our Designers and Engineers have a thorough knowledge of its behavior under exacting conditions. If you'd like to know what UNIFLEX can do for *you* write us about your problem. We'll be glad to help you—without obligation.



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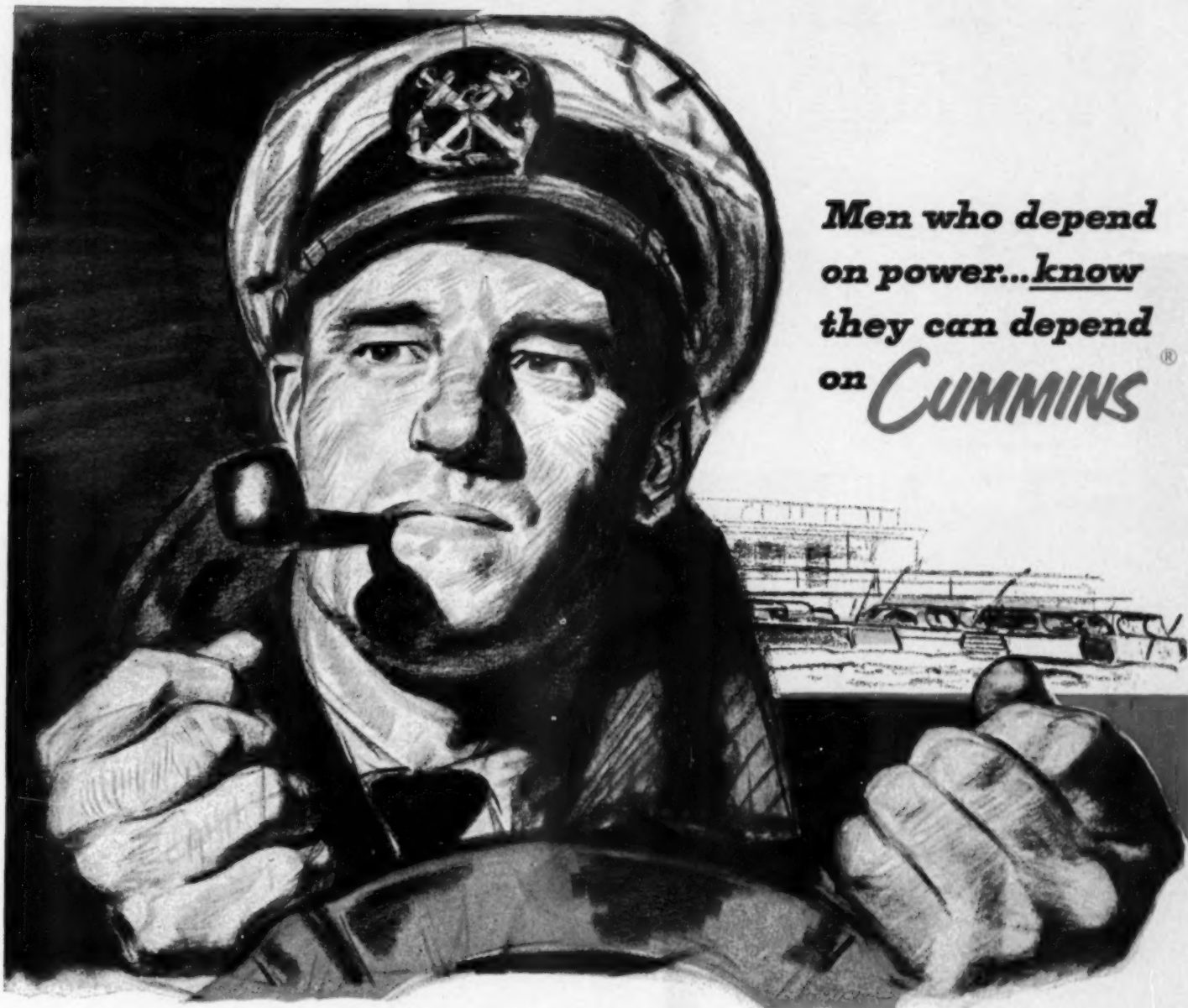
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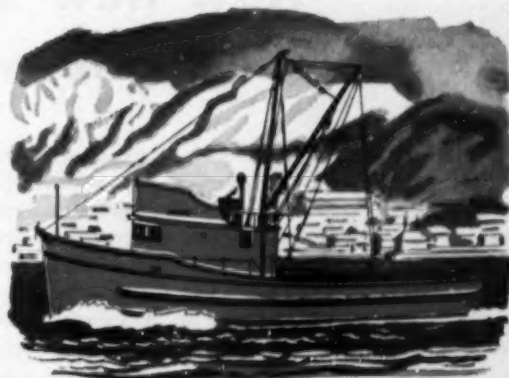
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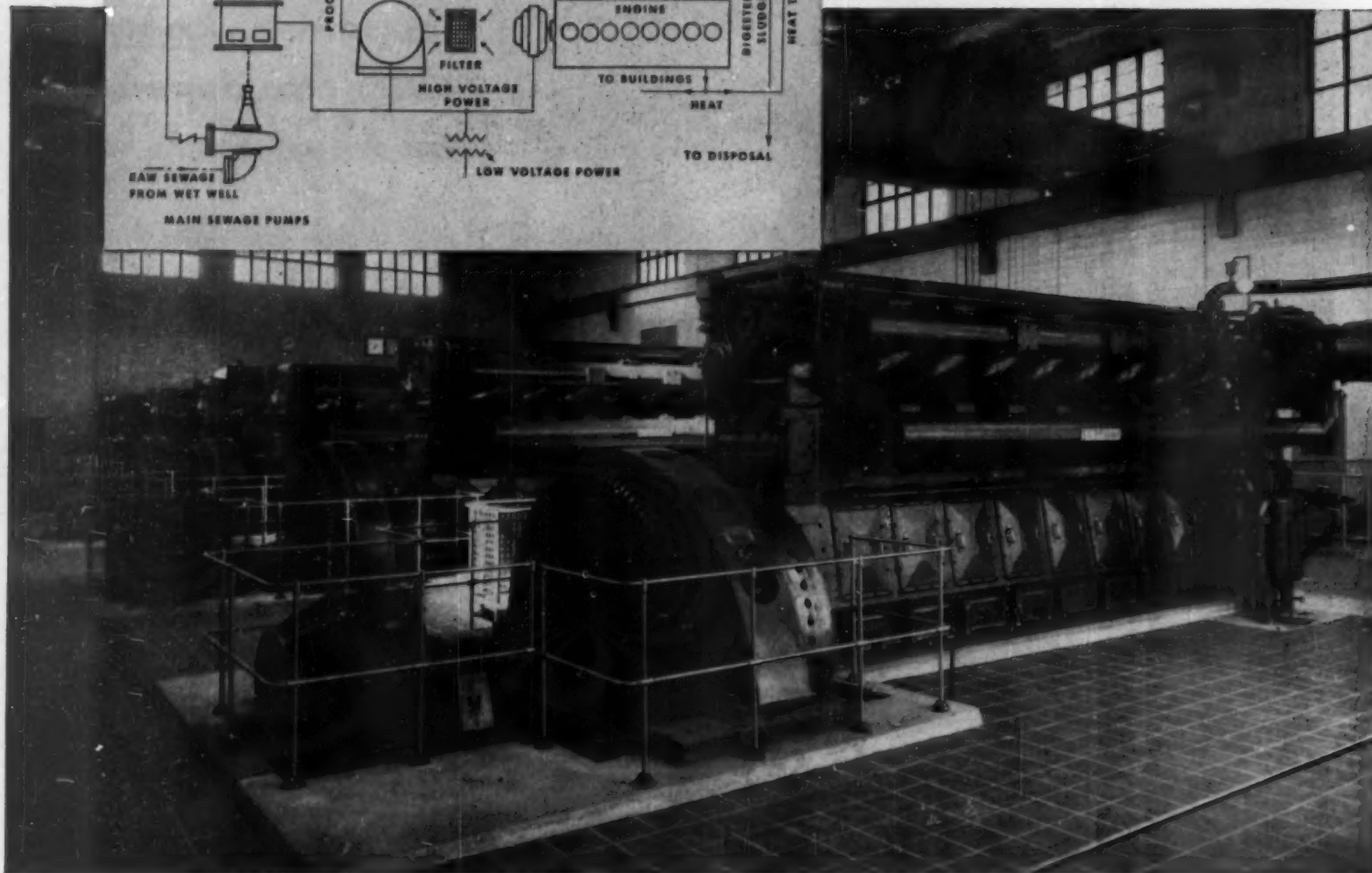
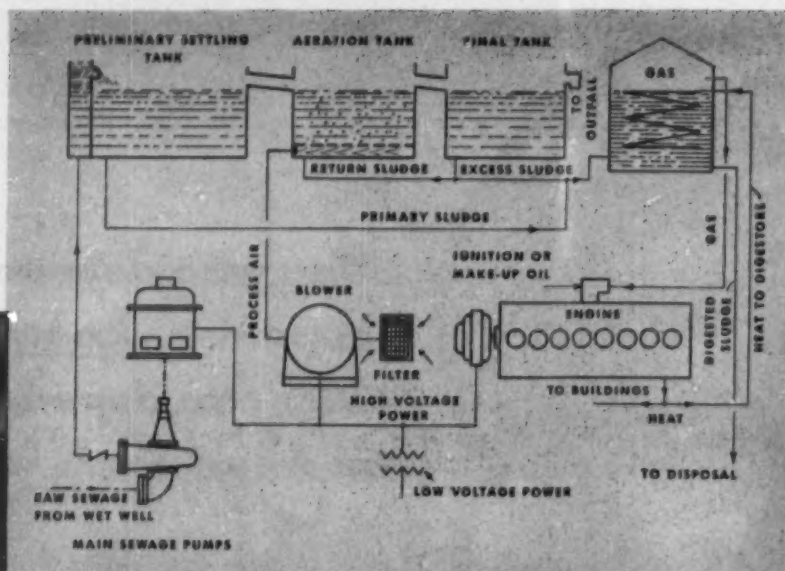
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***Leaders in rugged, lightweight, high-speed diesel power!***



## How new sewage treatment plant meets heavy power demands

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Since the public health is involved, continuity of plant operation is imperative. Dependable power, day and night, seven days a week, is assured by the inherent dependability of the Westinghouse Generators driven by dual-fuel engines . . . dependability that has been proved by many similar installations.

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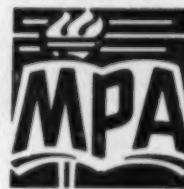


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## CONTENTS FOR JANUARY, 1953

Turbocharged High Speed Diesels.....	29
<i>Irving Crown</i> .....	32
New Marine Engine by G.M. Detroit Diesel.....	34
Harbormaster Propulsion and Steering Units.....	38
Tuna Clipper <i>Sea-Preme</i> .....	40
Steam Cooling Replaces Iceman.....	41
The Train Master.....	44
M/V <i>Louise</i> .....	46
Florida Keys Co-op.....	47
Alcan's New Project.....	51
The <i>Sans Terre</i> .....	54
Mascoutah, Illinois.....	55
Supervising & Operating Engineers Section.....	58
Two Superior Powered Dredges.....	64
TV Power Assurance.....	67

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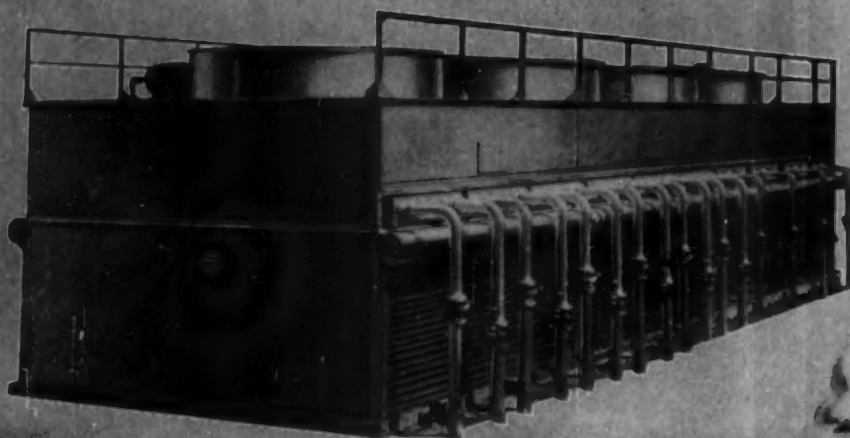


## FRONT COVER ILLUSTRATION

Marine Diesel Engine  
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and built by Camden  
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by Lynde Holden of New  
York. Powered by 2 GM  
Detroit Diesel twin die  
l engines.

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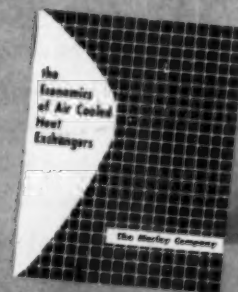
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Write for a copy of this brochure. It gives very complete information on application of DriCoolers in YOUR business. Address Department DC2.



**The Marley Company**

Kansas City 5, Missouri



# TURBO- CHARGED HIGH SPEED DIESELS

By WILBUR W. YOUNG

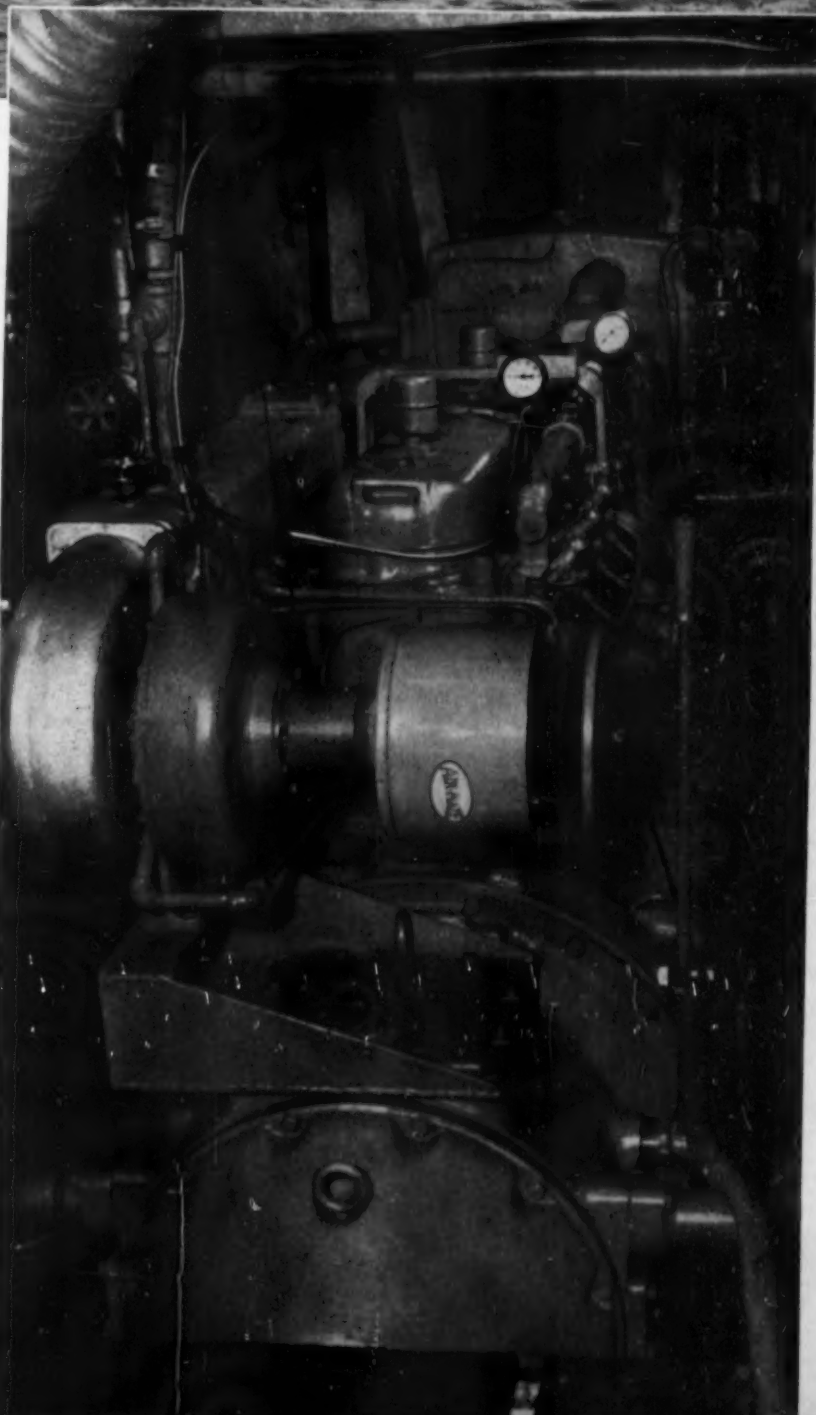
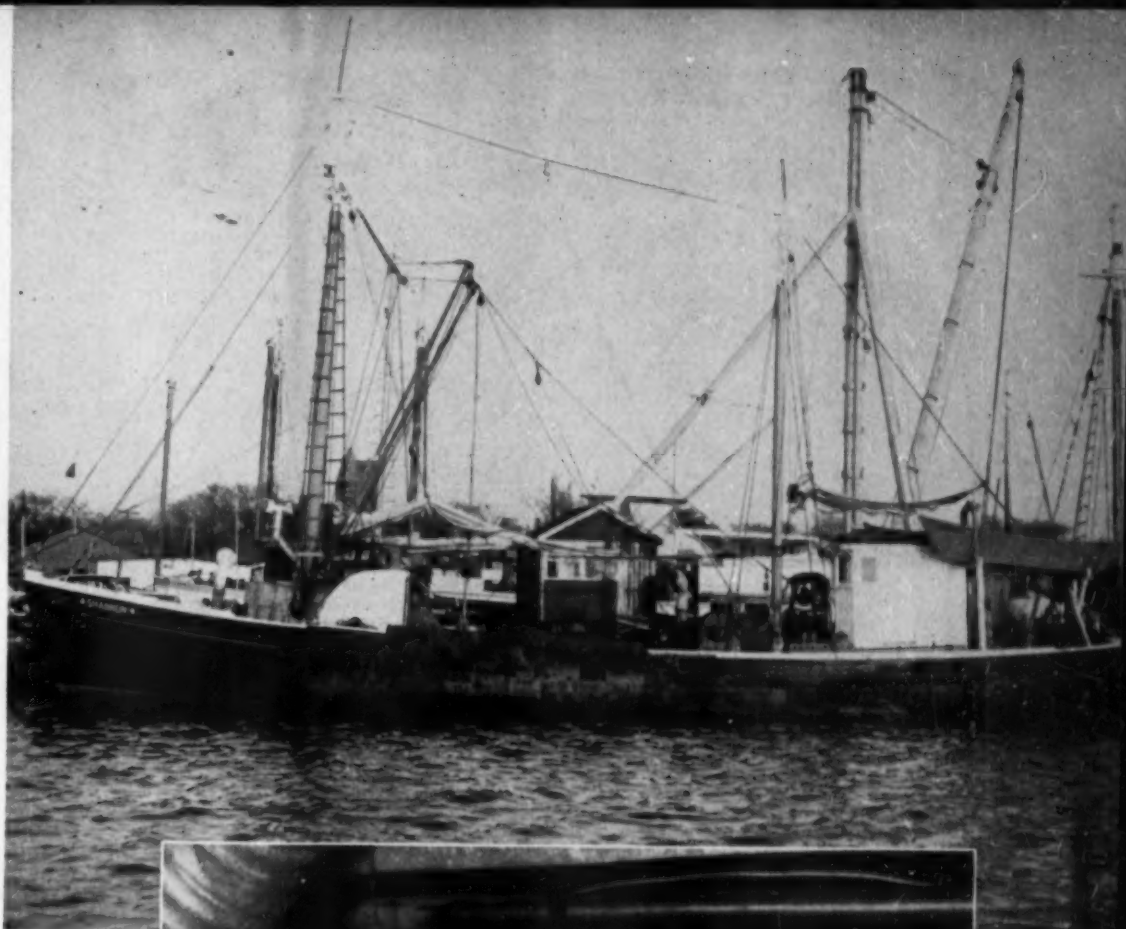
**W**ITHIN the past two years, a definite trend toward turbocharging moderate and high-speed diesels has been established. Probably the greatest single impetus given to this trend were the record-breaking qualifying runs of the Cummins Special on the Indianapolis Speedway last May. This race car was powered by a 4000 rpm. Cummins diesel fitted with the first Elliott Model M lightweight, compact turbocharger. The experience thus gained in a few short weeks advanced the art by years and encouraged others to join in the pioneering stages of this development. Packard has recently entered the scene with its line of 2000 rpm. turbocharged diesels and there are more.

High-speed diesels are steadily gaining favor among the operators of small and medium fishing craft and work boats. The lighter weight and smaller space requirements of these engines permit larger cargo space and heavier pay loads. And that appeals to fishermen. Then engine ratings can be increased 35 to 50% with the turbochargers now available, that add nothing to space requirements and comparatively little to specific engine weights.

Among those to take the initiative in these still early stages of high-speed diesel turbocharging were Hercules Motors Corporation, Cummins Engine Company, Waukesha Motor Co., and Wolverine Motor Works. It was at the latter's suggestion that Waukesha installed one of the Elliott Model M turbochargers on its Model WAKD engine with such satisfactory results that the block assembly with turbocharger were shipped to Wolverine for marine conversion. In less than a year, Wolverine is able to report a number of highly successful installations of these turbocharged diesels. (See table of boat characteristics, herewith.)

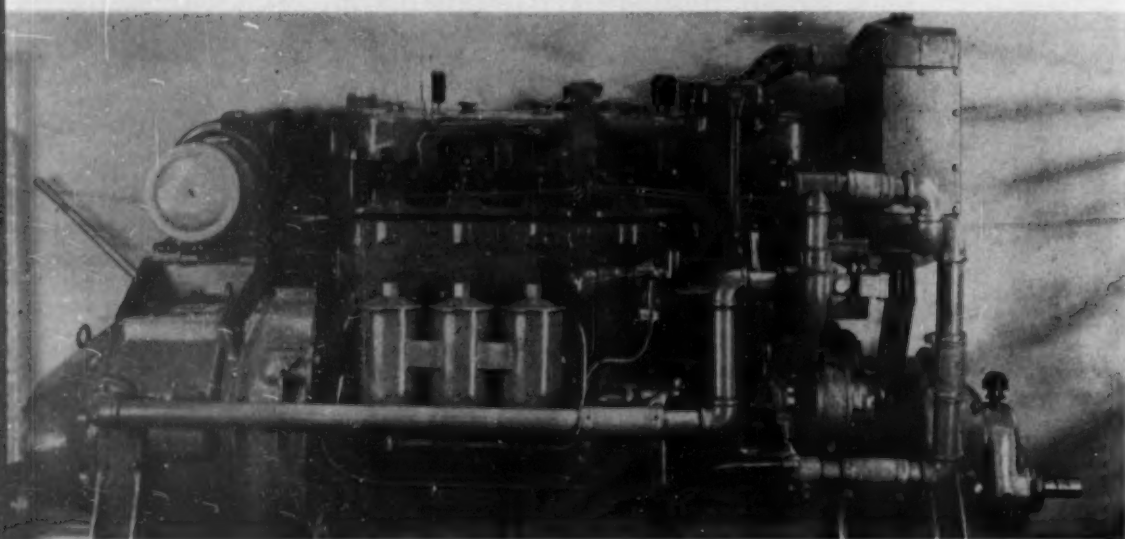
In making these marine conversions, Wolverine starts with the basic Waukesha block and head assembly. This is a 6-cylinder, 4-cycle, 6¼ in. bore, 6½ in. stroke full diesel. Basic equipment includes the gang-type, fuel injection pump, engine-mount-

The deep sea fisherman *Shannon* out of New Bedford, Mass., which was repowered in 1952 with a Waukesha model WAKD-T turbocharged diesel rated 225 hp. at 1400 rpm. Converted to marine use and installed by Wolverine Motor Works.





Close-up of the exhaust side of the Waukesha diesel, Model WAKD-T, 225 hp. at 1400 rpm., as converted to marine service by Wolverine Motor Works. Note Elliott type "M" turbocharger, Bosch fuel pump, Pierce governor, Snow-Nabstedt reverse gear and Leece-Neville air starter.



The other side of the Waukesha diesel, model WAKD-T, converted to marine service by the Wolverine Motor Works. Note the other view of the Elliott turbocharger, the Krogman lube filters, and the Twin Disc hoisting gear clutch.

ed lube oil cooler, fuel and lube filters, governor, thermostat and aluminum pistons.

It is a rather extensive job to fit the engines for marine service and some of the details are worth noting. First, the block is mounted on a base of Wolverine's design, providing hand holes for easy access to main and connecting rod bearings. A reverse-reduction gear, generally 3:1 ratio is fitted and provided with a pneumatic clutch control which is operated by push button in the pilot house. Most of the boats that are repowered by these engines have compressed air equipment, so

air starting motors are provided. Electric starting equipment is optional. On the forward end of the engine a hoisting gear is fitted, consisting of a clutch and 3:1 power take-off and V-belt sheave for driving the generator, air compressor and the bilge and deck pumps.

The closed fresh water jacket cooling system is served by a tubular-type heat exchanger mounted on the engine with removable bundle integral with

surge tank, fresh and salt water circulating pumps and automatic water temperature control. Fresh cooling water is circulated through the cast-in jacket in the turbocharger intermediate casing in the area adjacent to the turbine and the end bearing. The clutch, exhaust manifold and turbocharger hot gas inlet are raw water-cooled.

Air intake for the turbocharger is fitted with a 3 in. filter-silencer, and exhaust is through a 4 in. stainless steel elbow to which is attached a 4 in. to 6 in. increaser or diffuser which reduces back pressure on the turbine.

The full pressure lube system, including all moving parts and the enclosed overhead valve mechanism, is served by a gear-type pump that is externally mounted on the engine block where it is easily accessible. The engine mounted lube oil cooler is provided with an automatic by-pass for cold weather operation.

It is a real thorough job of marine conversion when Wolverine completes their work on the basically sturdy Waukesha engine assembly and these engines are building excellent records. The deep-sea fishers are finding it necessary to go further and further to the fishing grounds. It is now common for these boats to run at full throttle for 24 hours before dropping their nets. Engines have to be good, but they have to be better during the dragging operation and they stand up to the demand, even with the increased output obtained by turbocharging.

The Model M turbocharger is a comparatively recent addition to the Elliott line of turbochargers. It was developed specially for high-speed diesel engine application in marine, stationary and railroad service. Further development is under way to extend its uses in the automotive field. Emphasis has been placed on compactness and light weight while employing the basic design principles that have rendered Elliott turbochargers highly successful on larger engines.

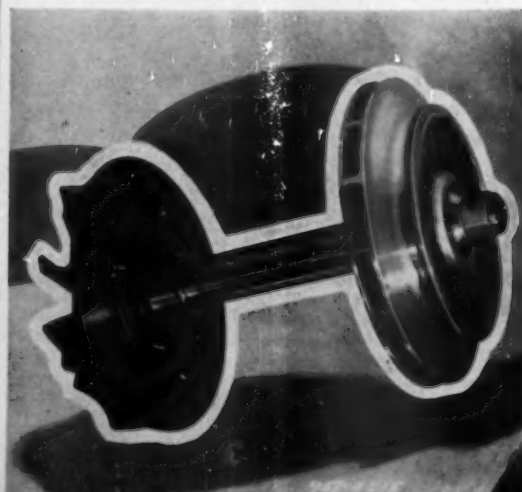
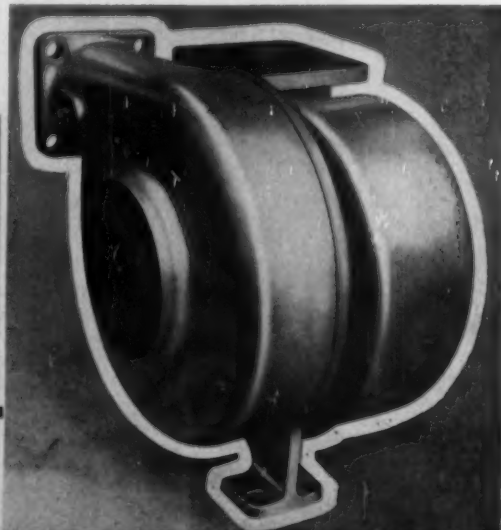
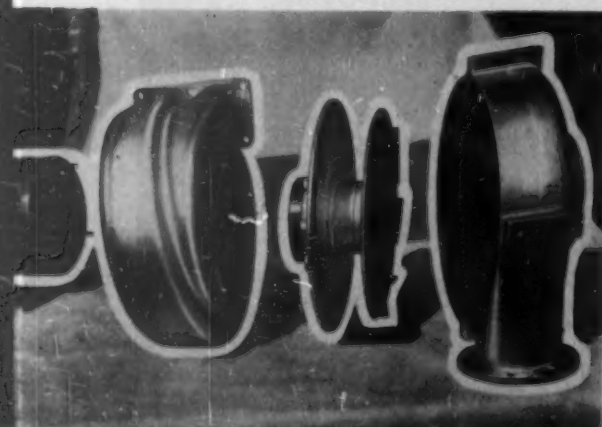
Like its predecessors, the Model M is a self-contained unit, composed of a gas turbine and a centrifugal blower, mounted on a common shaft with the necessary housings.

No control over the turbocharger is required as the correlated action of the turbine and blower is entirely automatic. The speed and output of the

Exploded view of the Elliott type "M" turbocharger as installed on the Waukesha diesels converted to marine service by Wolverine.

Exterior view of the Elliott type "M" turbocharger for medium- and high-speed diesels.

The "inside" of the model "M" Elliott turbocharger used on the engines described in this article.





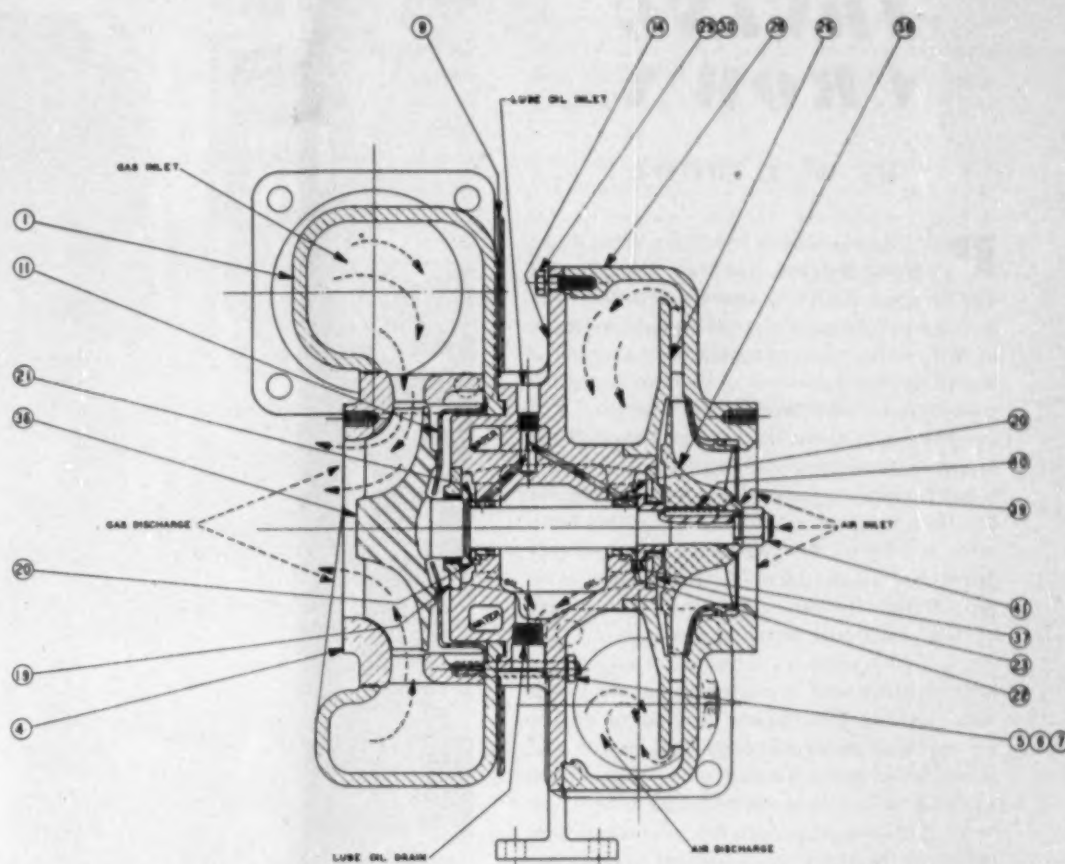
turbocharger vary automatically with variations in load and speed, or both, of the engine. Neither is it necessary to consider direction of rotation of the turbocharger when it is applied to a direct reversing engine. The turbocharger rotates in one direction only, regardless of the direction of rotation of the engine.

Structurally the unit is simple, yet comprised of such materials, properly sectioned as to withstand the high temperatures and rotative speeds under which it operates. The rotor assembly is comprised of the turbine wheel and shaft, the thrust collar, impeller, nose piece, key and elastic stop nut.

The turbocharger cooling system is connected into the engine fresh water jacket cooling circuit. A water jacket is cast in the intermediate casing in the area adjacent to the turbine and bearing. Likewise, lubricating oil for the turbocharger bearings is taken from the engine lubricating system. Lube oil that is by-passed to the turbocharger is specially filtered to protect the extremely small bearing clearances.

### List of Equipment

Basic Engines—Waukesha WAKD and NKD diesels.  
Marine Conversion—Wolverine.  
Turbocharger—Elliott Model M.  
Reverse and Reduction Gear—Snow-Nabstedt.  
Pneumatic Clutch Control—made by Snow-Nabstedt under Westinghouse Air Brake license.  
Air Starting (Electric optional)—Leece-Neville.  
Fuel Filters—Zenith and American Bosch.  
Fuel injection—American Bosch.  
Governor—Pierce.  
Lube Filters—Krogman.  
Jacket Water Cooler—Wolverine.  
Lube Oil Cooler—Ross.  
Hoisting Gear Clutch—Twin Disc.  
Alarm Switch (Lube Oil Pressure and Jacket Water Temperature)—Penn.  
Intake Air Filter-Silencer—Air-Maze.  
Raw Water Pump—Marine Products.



Cross-Sectional Assembly

1	Inlet Casing	23	Oil Seal--Blower End
4	Nozzle Ring	26	Diffuser
5	Stud--Nozzle Ring	28	Blower Casing
6	Nut--Nozzle Ring Stud	29	Cap Screw--Blower Casing
7	Lockwasher--Nozzle Ring Stud	30	Lockwasher--Blower Casing Cap Screw
9	Radiation Shield--Outer	36	Expander Wheel and Shaft Assembly
11	Radiation Shield--Inner	37	Thrust Collar
14	Intermediate Casing	38	Impeller
19	Oil Seal--Turbine End	39	Nose Piece
20	Pin--Bearing Locating	40	Key
21	Bearing--Turbine End	41	Elastic Stop Nut
22	Bearing--Blower End	42	Rotor Assembly

Sectional view of the model "M" Elliott turbocharger for use on medium- and high-speed diesel engines.

### WOLVERINE POWERED BOAT CHARACTERISTICS WITH WAUKESHA DIESELS CONVERTED FOR MARINE USE BY WOLVERINE

Name	Type	Port	Length	Beam	Depth	Gross Tons	Prop Type	Prop Size	Engine Model	Hp.	Rpm.	Red'n. Gear	Turbocharger
MANDALAY	Deep Sea Fisher	New London	60	16.6	6.2	36	3 Blade	48x32	WAKD-N	165	1400	3:1	Nat. Aspirated
BARBARA	Scallop Boat	New Bedford	59.7	17	8	39	3 Blade	48x30	WAKD-N	165	1400	3:1	Nat. Aspirated
*DAUNTLESS	Deep Sea Fisher	New Bedford	56	15.5	7	36	3 Blade	50x29	WAKD-N	165	1400	3:1	Nat. Aspirated
ARNOLD	Deep Sea Fisher	New Bedford	50	16.3	7.3	36	3 Blade	44x34	WAKD-N	165	1400	3:1	Nat. Aspirated
WEEZIE-MAY	Inshore Fisher	New London	55.8	14.5	5.8	26	3 Blade	40x30	WAKD-N	165	1400	2.5:1	Nat. Aspirated
ANTONIO	Scallop Boat	New Bedford	76.6	16.3	8.4	54	3 Blade	48x36	WAKD-T	225	1400	3:1	Elliott M-5
ANTONINA	Scallop Boat	New Bedford	66.6	16.3	7.7	45	3 Blade	48x36	WAKD-T	225	1400	3:1	Elliott M-5
SHANNON	Deep Sea Fisher	New Bedford	66.3	17	7.9	43	3 Blade	50x32	WAKD-T	225	1400	3:1	Elliott M-5
BOBBY and HARVEY	Scallop Boat	New Bedford	65	17.7	9.8	63	3 Blade	49x32	WAKD-T	225	1400	3:1	Elliott M-5
*ACME	Inshore Fisher	Boston	62.9	13.7	7.2	43	3 Blade	46x38	WAKD-T	225	1400	3:1	Elliott M-5
ROMA	Inshore Fisher	Boston	58.6	15.5	7.4	39	3 Blade	48x32	WAKD-T	225	1400	2:1	Elliott M-5
LAWRENCE SCOLA	Inshore Fisher	Portland, Me.	56.7	14.8	7.1	31	3 Blade	46x34	WAKD-T	225	1400	3:1	Elliott M-5
LITTLE JOE	Inshore Fisher	Gloucester	62.4	16.2	7.5	37	3 Blade	48x32	WAKD-T	225	1400	3:1	Elliott M-5
WAMSUTTA	Scallop Boat	New Bedford	84.3	18.7	9.1	76	3 Blade	58x36	NKD	250	1100	3:1	Nat. Aspirated
JOAN and URSULA	Deep Sea Fisher	New Bedford	69.5	18	8.9	60	3 Blade	56x35	NKD	250	1100	3:1	Nat. Aspirated
AUSTIN W.	Deep Sea Fisher	Bridgeport	66.8	16.6	8.8	54	4 Blade	52x40	NKD	250	1100	3:1	Nat. Aspirated
BRANT	Scallop Boat	New Bedford							NKD	250	1100	3:1	Nat. Aspirated

\*Engines installed in 1951. All others installed in 1952.

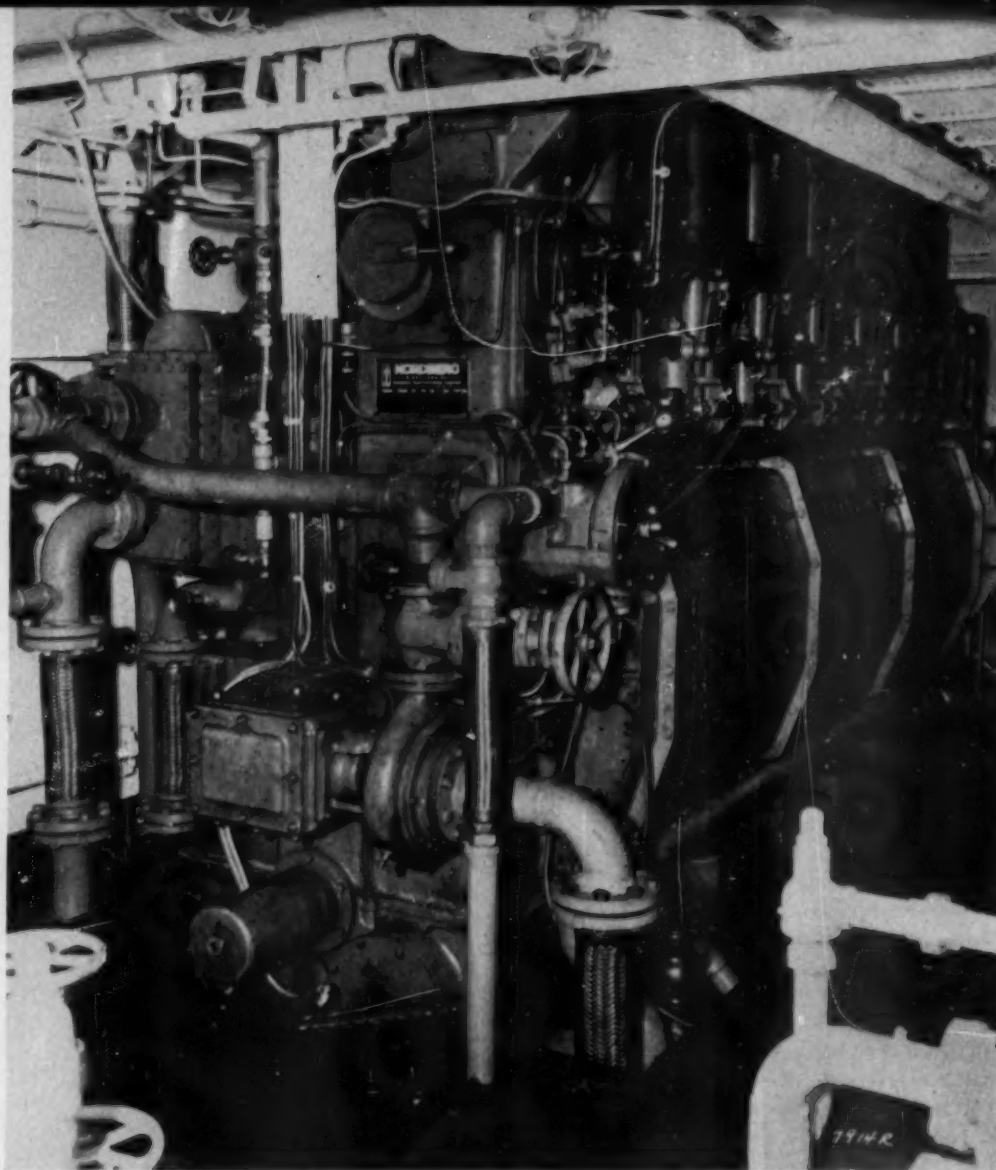
# IRVING CROWN

By W. L. BODE

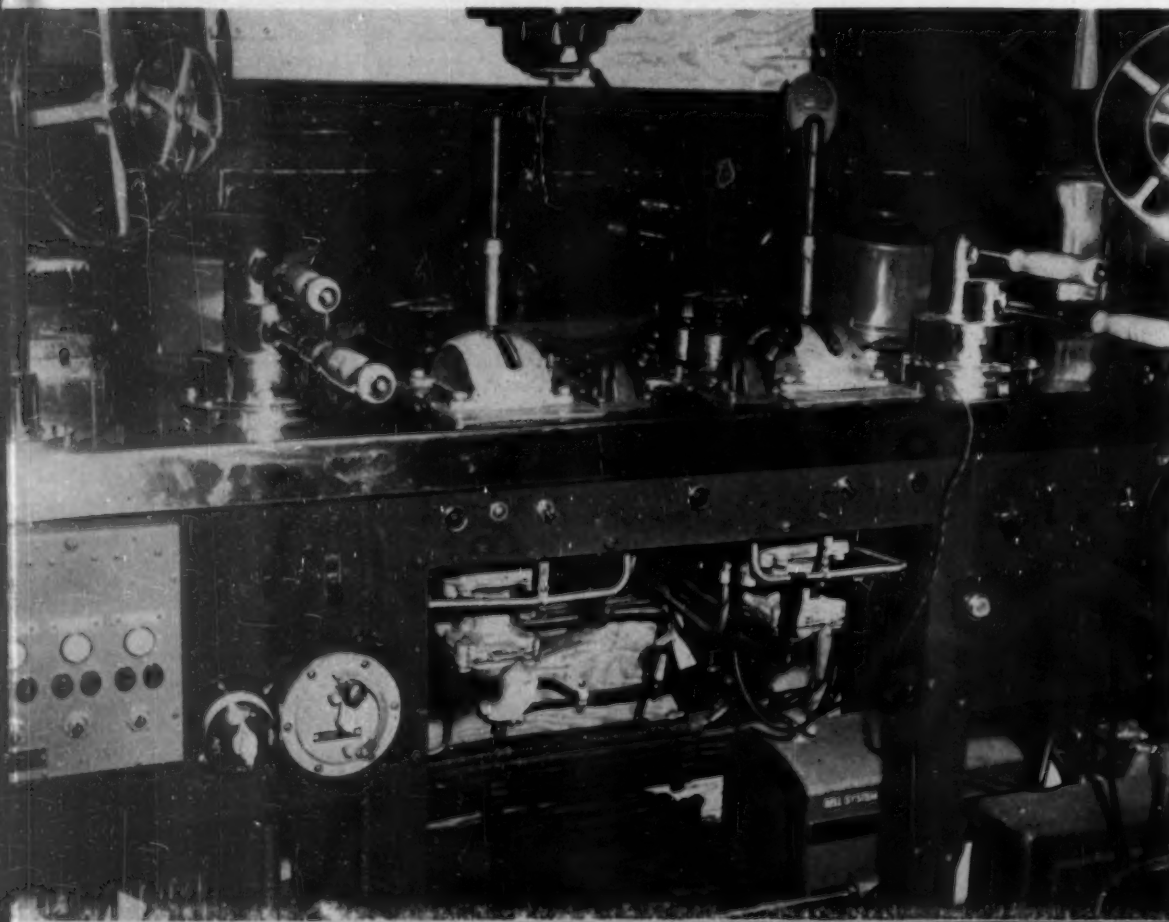
**P**OWER packed with two direct drive, direct reversing 800 hp. Nordberg Supairthermal diesel engines, the *Irving Crown*, a new twin screw pusher type towboat, was recently placed in service by Material Service Corporation of Chicago. This firm is the largest producer of concrete aggregates, crushed stone and lime in the Midwest. The vessel was built to the highest classification of the American Bureau of Shipping for river service. It was designed by Sturgeon Bay Shipbuilding and Dry Dock Company and constructed at that firm's yards in Sturgeon Bay, Wisconsin. The towboat's design incorporates ideas of Arnold Sobel, manager, Marine Division, and Melvin Hulett, port captain of Material Service Corporation.

Most powerful and maneuverable of the vessels with elevating pilot houses designed specifically for operation under Chicago's fixed bridges and in the Calumet Sag Channel, the *Irving Crown* was built to push eight loaded barges of 1400 tons each. The fact that this river towboat is propelled by Nordberg Supairthermal engines has drawn considerable attention from the rivermen and officials of aggregate producing plants utilizing river transportation. The two Nordberg Supairthermal diesel engines are each of the four-cycle heavy duty direct reversing marine type with six cylinders of 13 in. bore and 16½ in. stroke. These Nordberg engines were selected by Material Service Corporation because of several design advan-

Pilot house controls on the *Irving Crown* recently placed in service by Material Service Corporation, Chicago. Engine controls are Westinghouse Air Brake; tachometers are Weston.



One of the two 800 hp. Nordberg Supairthermal diesel marine engines installed on the *Irving Crown*.





tages they have over conventionally turbocharged diesel propulsion engines. Employing the Miller system of supercharging, these Supairthermal engines operate at 160 lbs. bmep. which results in one-third more horsepower. Thus the engines produce substantially more horsepower in a limited space. In a vessel of this type where low rotative speed is essential for maximum propeller efficiency, the Supairthermal engines will develop the same horsepower at 25 per cent less rpm. than conventional turbocharged engines of the same size. These engines will turn 78 in. diameter cast steel propellers through an 8½ in. diameter tail-shaft and an intermediate shaft of 9 in. diameter, which is considerably over the minimum requirements of the American Bureau of Shipping for this type of vessel.

Another significant design feature of this vessel is the auxiliary equipment arrangement. All engine pumps except those for raw water are motor-driven with power supplied by a pair of 75 kva. General Motors diesel generator sets. With this system, the Nordberg engines can be shut down while the vessel is in the locks and the cooling system will prevent any sudden rise in operating temperature and by continuous recirculative cooling gradually decrease the engine temperatures. Standby motor and pump units, instead of being stored ashore, are installed and piped for rudder, engine lube oil and engine jacket water service and are ready for immediate use at the turn of a valve.

The new towboat is designed with a modified V-type all-electric welded steel hull, 103 feet in length, 30 feet in beam and 10 ft. 9 in. in molded depth. The normal draft is 7 ft. 6 in. loaded. Fuel oil storage capacity on the vessel is 31,500 gals.; potable water, 10,000 gals.; and filtered water, 1,300 gals. Water for engine make-up will be drawn from the potable water supply. In designing the towboat, every provision was made for a hull of exceptionally heavy duty construction. Two longitudinal bulkheads and five longitudinal girders carry maximum strength throughout the vessel's length. Main deck plating is of 5/16 in. plate with ¾ in. x 36 in. stringer plates extending the full length of the vessel, except in way of the engine room where 7/16 in. is used. The plating on the bow has been increased from a normal thickness of ¾ in. to a thickness of ½ in. for service in ice. The hull is framed transversely and is divided into five watertight bulkheads which give the vessel six watertight compartments. To increase her watertight integrity, the engine compartment has been subdivided into main and auxiliary engine rooms. The two are connected by a watertight door.

Because of the close clearances in which the vessel will operate, it was built with a high degree of maneuverability. Two independently connected electric hydraulic steering gears, one for the four flanking rudders and the other for two steering rudders are installed and controlled from the pilot house. The elevating pilot house is mounted on a hydraulic ram with controls in the pilot house

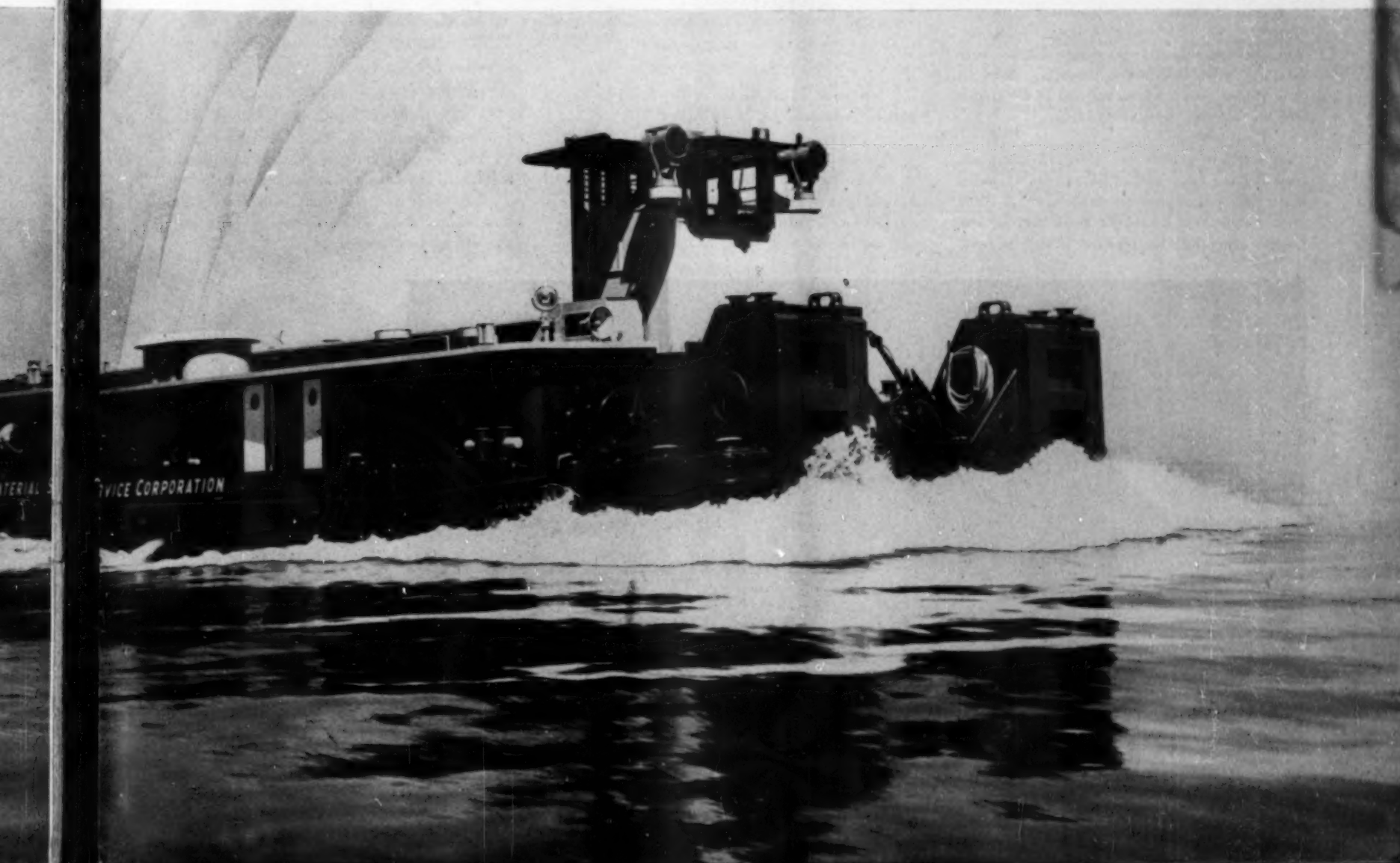
adjacent to the steering stand. When the pilot house is in a raised position the towboat has a clearance line above the water of 21 ft 9 in. When lowered this line is 13 ft. 9 in.

Staterooms and passageways are so arranged that it is unnecessary for a crew member to go outside during inclement weather. The vessel's galley is all-electric and complete in every respect. Christening of the *Irving Crown* was held in Chicago in August of this year. The new vessel augments and is the most powerful and versatile of Material Service's present towboat fleet.

#### List of Equipment

Main engines—Nordberg, 6 cylinders, 13 in. bore, 16½ in. stroke, direct reversing 300 rpm., 800 hp.  
 Auxiliary generator sets—General Motors Detroit diesel.  
 Turbochargers—Elliott.  
 Air compressors—Gardner-Denver.  
 Heat exchanger—Ross.  
 Lube oil coolers—Ross.  
 Main engine lube oil filters—Hilliard Corp.  
 Pyrometers—Alnor.  
 Switchboard—Pelham Electric.  
 Lube oil transfer pump—Haight Pump Co.  
 Thermostatic valves—Fulton-Sylphon.  
 Pilot valves—Automatic Switch Co.  
 Main engine controls—Westinghouse Air Brake.  
 Tachometers—Weston.  
 Turbocharger lube oil filters—Nugent.  
 Fuel oil filters—Nugent.

The 103 ft. by 30 ft. by 10 ft. 9 in. *Irving Crown*—new towboat for operation in and around Chicago.



# A BRAND NEW MARINE ENGINE BY GM DETROIT DIESEL

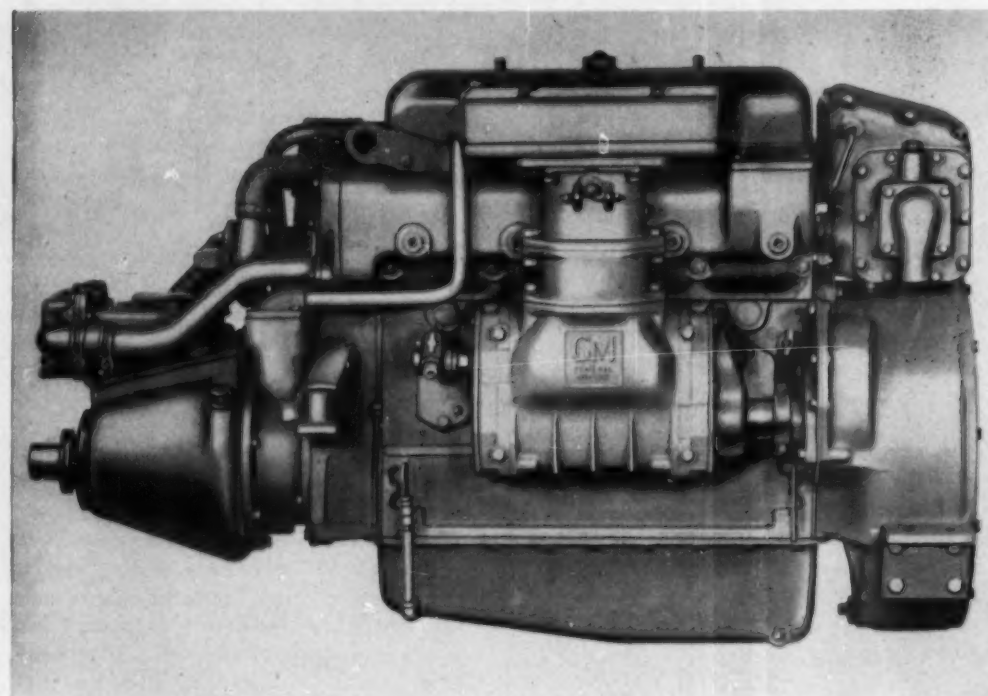
By REX W. WADMAN

**D**ETROIT, December 15. From early morning, through noon till late at night, that's the story of this eventful day in my long life. I was invited out here to see a new marine diesel; I've seen it, I'll tell you about it later.

There has been more to this day than seeing a new engine. For some forty-five years, in season and out of season, I have consistently and persistently preached the gospel of diesel economy, of diesel efficiency—"Try one, it will do your job better, for less." It's been a long, discouraging (at times) task but today I saw the job had been worth while. As I look up over the hill and just around the corner to the traditional three score years and ten (I have but six short spans to go) it has been a life well spent. Today, as I walked miles through this huge plant, down one aisle and up the other; from test cell to test cell, I saw mass production of diesel engines brought to such a fine point as to make my most optimistic dreams of the past doubled and tripled in their immensity.

Here at thirteen thousand, four hundred West Outer Drive in this motor city of Detroit, in the sprawling plant of the General Motors Detroit Diesel Engine Division, I walked up and down and through a plant producing more diesel engines per hour, per day, per week, per month and per year than any other diesel manufacturing plant in these United States, and to the best of my knowledge, in this wide, wide world of ours.

They start out at one end as bits of metal and come out the other end to go into trucks, buses, boats, tractors and into thousands of other applications where they do the job better and for less. A great sight which has renewed (if that be possi-

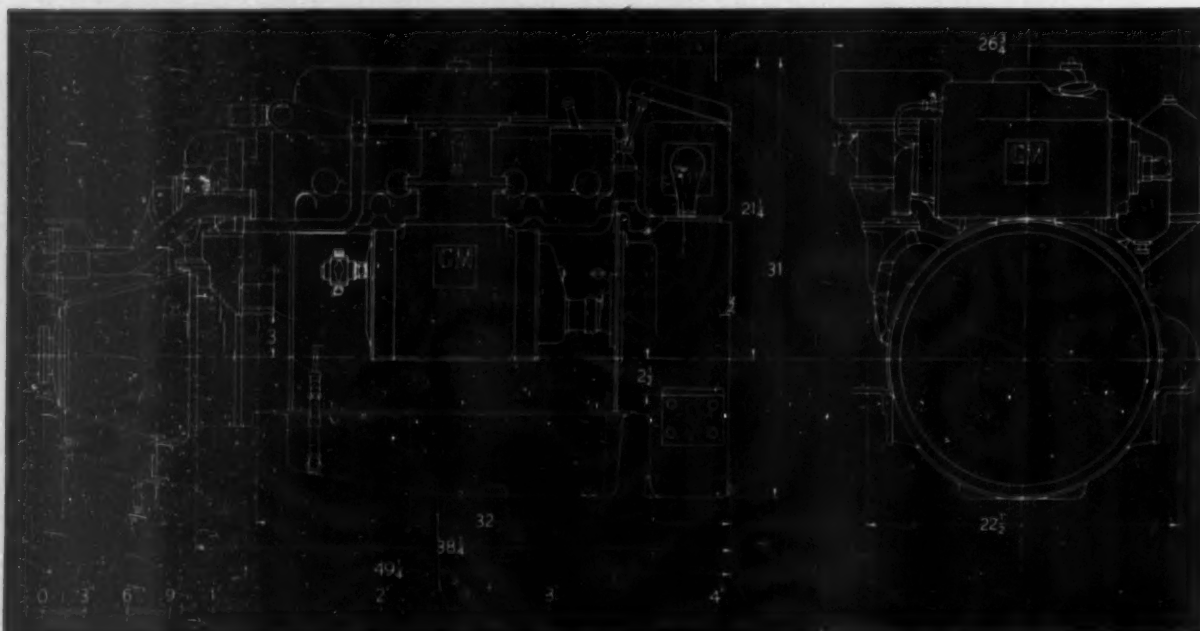


Shown here with direct drive and reverse gear is General Motors new Series "51" Marine diesel engine designed for work boats, fishing boats and pleasure craft of 26 feet and up. It develops 87 hp. at 3,000 rpm. and according to the Division's announcement has many new simplicity features.

ble) my faith in the future of the diesel in our national economy.

Well to get down to the job I came out here today to do—see the new marine engine. I saw it, spent a lot of time with it. On the three following pages, I'll give you full details but let's hesitate a moment and outline the high spots. As you might suspect

it's a two cycle unit for marine application. It will be the high point of interest in the Motor Boat Show, which opens in the Grand Central Palace, New York on the evening of January ninth next. Users, prospective diesel users and the competition will look, argue and talk. Some will shake their heads, many others will buy—but in every case there will be keen interest.



This is the "51" series engine reduced to scale of 1 in. to 1 ft. It shows the degree of compactness Detroit Diesel engineers have achieved in this new 87 hp. marine diesel.



It's a compact, four cylinder unit differing considerably from previous Detroit Diesel models. Take a look at the cross section at the bottom of this page—news isn't it? Loop scavenging applied to a comparatively small, light weight diesel. The blower itself is a simple Roots type straight through lobe design, placing the smallest possible parasitic load on the engine in supplying its scavenging air. Take a look at the piston on the right hand side here where you see the air intake and exhaust ports.

Then take a look at the top of this new marine engine on the next page. Clean isn't it? No exhaust valves, no camshaft—that's been moved downstairs to the main floor so-to-speak. Just the fuel injection valve and the fuel line for each cylinder. Simplified maintenance. The governor in this same picture is worth looking at; it's an important feature of this new engine. Simple, fool proof and effective in its control of engine speed. I wonder it hasn't been thought of before.

Take another look at the dimensional drawing on the first page of this article. It's a compact job, both end wise and up and down. You're going to like this little engine.

From one of the test cells, I went up into the conference room of the engineering department and spent an interesting hour and half. The men who brought this new marine engine to life sat around that table and told me of the trials, tribulations, and heartaches that went into it. It wasn't anything like they dreamed it was going to be, so many changes had to be made. This talk with these really great men here this afternoon reminded me of my first visit to the Detroit Diesel plant, away back on January 19, 1938, when I described and illustrated the first Detroit Diesel (DIESEL PROGRESS, February 1938). I rode back downtown that night with Boss Ket (Dr. G. F. Kettering) and he talked just about the same way these engineers did here today—these men are never satisfied, they're always trying to do the impossible. They didn't come far off it in this model 51.

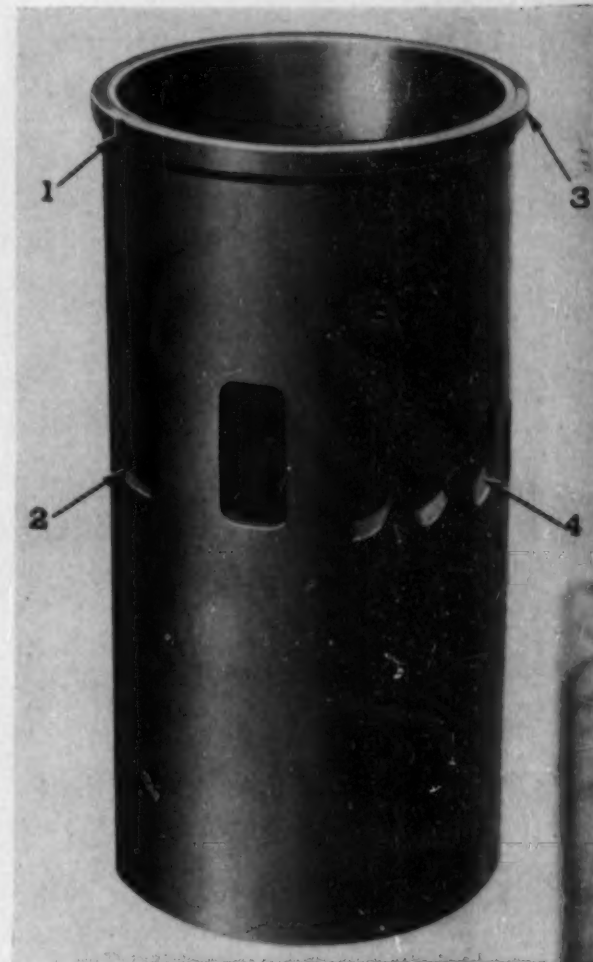
The new 87 hp. marine diesel (Model 4-51) was designed for use in craft of 26 feet and up. Detroit Diesel engineers report that this engine represents a new degree of compactness in diesel engine design and makes GM two-cycle diesels available to an entirely new group of boat owners. The engine's compactness is reflected in the following dimensions: It has an overall length with direct drive and reverse gear of 49¼ inches; overall height is 31 inches; height measured from the centerline of the output shaft is 21¼ inches. It has a width of 26¾ inches with 22½ inch bolt centers.

Weight of the basic engine is 1200 pounds. With direct drive and reverse gear it weighs approximately 1400 pounds.

The engine has four cylinders arranged in line with a total displacement of 216 cubic inches. It has the favorable design feature of being a "square" engine as both bore and stroke are 4.1 inches. It develops 87 hp. at 3000 rpm. and has an output of 89 hp. at 2500 rpm. with accessories. Compression ratio is 18 to 1.

In keeping with common marine practice the fly-wheel is located on the front end of the engine to provide better conformity with the hull and also to provide easier installation of a front-power take-off. According to the Division's announcement the engine has the greater flexibility, faster acceleration and speed range desirable in most marine applications while it retains the characteristic safety, economy and long life features of a true diesel engine. Like Detroit Diesel's "71" and "110" series engines, the new power plant is of two-cycle design which provides power at every downward stroke of the piston. Combustion chambers are of the open type with no precombustion chambers or special "cells" needed to insure complete combustion.

The new engine has a forced-feed lubricating system, a centrifugal type fresh water pump and an impeller type raw water pump. Replaceable main and connecting rod bearings and replaceable cylin-

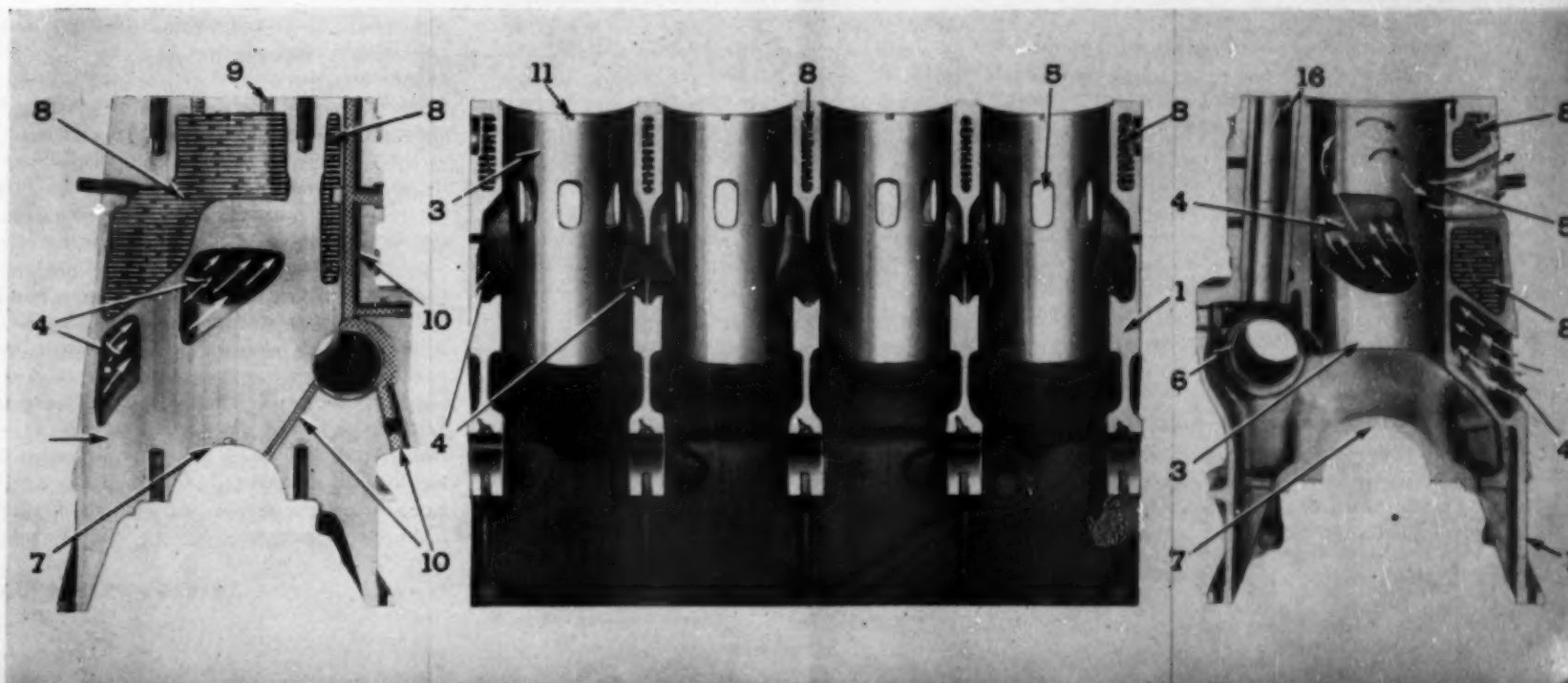


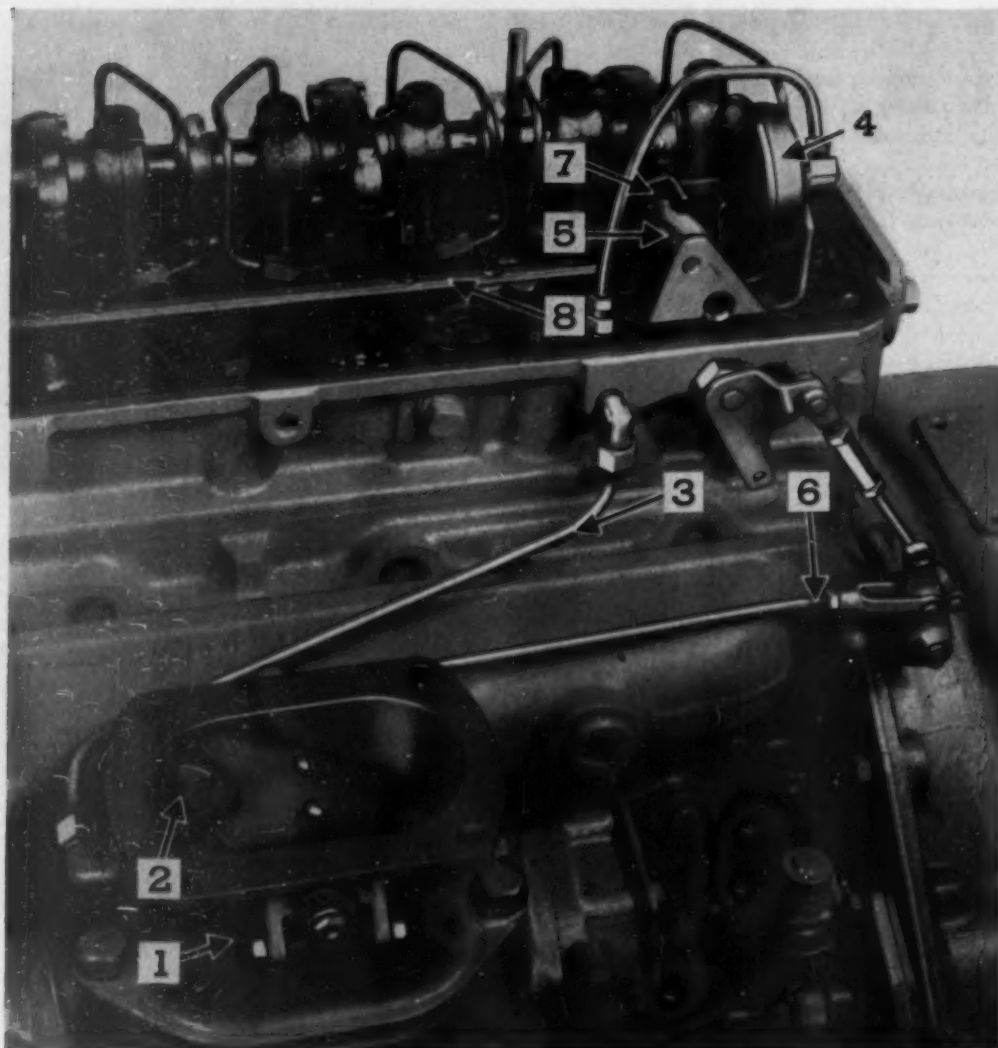
Series "51" cylinder liner showing air intake and exhaust ports. 1—Notch for retaining dowel. 2—Exhaust port. 3—Flange for seating cylinder liner in block. 4—Intake port.

der liners add to longer life and decrease cost of overhaul.

Aluminum end plates furnish steel-to-aluminum bearing surfaces on the blower eliminating the need for costly ball or needle bearings in this assembly.

Series "51" cutaway drawings showing air, water and oil passages in block and loop scavenging in cylinders. 1—Cylinder block. 3—Cylinder liner. 4—Air intake passage. 5—Exhaust ports. 6—Camshaft bearing. 7—Upper main bearing support. 8—Cooling water jacket. 9—Block to cylinder head water passage. 10—Oil passage. 11—Liner locating dowel hole. 16—Sleeve cam follower hole.





Simplicity of the new General Motors 4-51 marine engine governor is illustrated in the above photo, showing rocker-arm cover removed. Air passing through the air valve housing (1) and venturi (2) sets up a vacuum in the tubing (3) and operates a diaphragm in its housing (4). This diaphragm pulls against the injector control spring (5) through injector control lever (7). Tendency of the spring to feed more fuel by opening up the injector control rack (8) is balanced

against the pull of the diaphragm. As engine speed tends to fall off when additional load is applied, the air passing through the venturi lessens, the vacuum decreases and the spring feeds more fuel to the engine through the injectors. Despite the governor's simplicity of operation, it keeps the engine operating at the speed set by the air control lever (6) regardless of any load condition imposed on the engine which falls within the power range of the diesel.

Rayon flocking is securely bonded to the blower rotors to assure maximum sealing action without costly machining.

Detroit Diesel engines have always used intake ports in the cylinder liners to deliver fresh air to the combustion chambers. Exhaust has been through exhaust valves operated from the camshaft which is common practice in most engines. The new engine, however, utilizes another set of cylinder liner ports for the purpose of exhausting the used gases from the cylinders. These ports are larger than the intake ports and their use, instead of valves, permits more efficient operation of the engine at high speed, reduces the number of moving parts required and also reduces the over-all height of the engine.

A Roots type blower is the "heart" of the engine's breathing system. Air travels from the blower to the combustion chambers through passages in the block which have a pronounced upward slope. This directs the air upward and across the top of the

cylinder. Spent gases are thus swept out of the combustion chamber through the exhaust ports and are replaced with fresh air at the bottom of each power stroke. At the top of the compression stroke a small amount of diesel fuel is atomized and sprayed into the chamber. The resulting combustion which occurs solely from the heat of the compression, forces the piston downward in the power stroke.

The entire governor (including a two and one half pound venturi casting) weighs only four pounds. Principal parts are the venturi casting, air intake valve, a simple diaphragm and a coil spring which tends to move the injector control lever to a full fuel position. As engine speed increases or decreases according to load the resulting air pressure fluctuations in the venturi vary the vacuum in the diaphragm and cause it to expand and contract. As the diaphragm is connected to the spring this action works against the spring allowing the injector control lever to move back and forth to varying fuel delivery positions. Despite the gov-

ernor's simplicity of operation it keeps the engine operating at the set speed regardless of any load condition which falls within the power range of the engine.

The lubricating oil pump is of the rotor type and attains maximum simplicity through its unique location. The pump's inner rotor, which is mounted directly on and revolves with the crankshaft drives the outer rotor. Hence, no gear or chain pump drive is needed. Capacity of the pump is 22 gallons per minute at 3000 engine rpm. The pump picks up oil from a sump and forces it through a plate type oil cooler mounted on the camshaft side of the cylinder block. From the cooler it is forced into the hollow camshaft and thence to the various bearings and other points requiring pressure lubrication.

The engine features heat-exchanger cooling with only fresh water reaching the block, head and exhaust manifold. Most of the trouble caused by corrosion and silting is thus eliminated. The heat exchanger has a replaceable anti-electrolysis plug and with connecting lines is the only part of the cooling system that comes in contact with raw sea water. The heat exchanger is easily accessible for servicing. The coolant pump is of the centrifugal type and the raw water pump is of the positive displacement type. The latter is an easily-serviced Jabsco pump designed exclusively for use in GM diesel engines. Both are gear-driven through an auxiliary gear train from the camshaft and are mounted on the auxiliary gear train housing at the rear end of the engine. A 170-degree thermostat keeps engine temperatures within the desirable 160-180 degree range. Keel cooling is optional.

A separate cooling system is used in the reverse and reduction gear. The cooler is a self-contained unit with the gear and is mounted on the gear housing. It has no outside oil connections. Various tests in which the gear has operated in reverse continuously for periods up to 50 hours under load have demonstrated the gear's adequate cooling and positive lubrication. A flexible spring-type coupling located between the gear and the engine cushions both gear and engine from the shock of sudden load increases.

The "heart" of the fuel system is the GM diesel unit injector. One of these is mounted in the cylinder head directly over each cylinder. The injector measures the amount of fuel to be injected under varying conditions of speed and load, builds up the high pressure needed to inject the fuel into the combustion chamber and atomizes the fuel charge into minute particles for fast, smooth and complete combustion. Fuel is picked up from the supply tank through a primary fuel filter by a gear-type pump driven by the auxiliary gear train. Several times more fuel than is actually required is forced under pressure of approximately 45 pounds per square inch through the secondary fuel filter, the fuel intake manifold and the injectors. Fuel not used by the injectors is returned to the tank via the fuel outlet manifold and necessary fuel lines. In this manner fuel is constantly circulating through the injectors acting as an additional cooling agent and preventing "air lock" by carry-



ing off any air which may have collected in the system.

The engine employs a simple and effective system of balancing. The crankshaft is counterweighted to balance out the eccentric rotating masses of the connecting rods and journals. In addition, any tendency to "rock" due to the pistons at the ends of the engine moving in opposite directions, is counteracted partly by the crankshaft counterweights and partly by balance weights at each end of the camshaft. The camshaft runs through one side of the cylinder block just above the crankshaft. In addition to contributing to better dynamic balance it also serves as an oil gallery and operates the injectors. This it does through the use of roller-type cam followers, push rods and rocker arms. It is driven by means of a gear on the flywheel end of the engine which contacts a central gear on the end of the crankshaft. This same crankshaft gear also rotates the blower drive gear through an idler gear.

The method of compression, oil and water sealing between the engine block and head is the same as that so successfully used in the Division's "71" and "110" models for over a year. Replacing the single laminated gasket commonly used in internal combustion engines are compressible metal and synthetic rubber "O" rings. The individual metal compression sealing rings are located directly on top of the cylinder liner by means of a flange which fits into a recess between the cylinder liner and the cylinder bore in the block. The rubber "O" rings fit into grooves machined in the block around water and oil passages. When the cylinder head bolts are pulled down, metal-to-metal sealing is assured at each cylinder opening and positive leak-proof sealing is provided at the other openings.

### New Inclined Model

Sharing the spotlight at the Division's exhibit at the National Motor Boat Show in New York will be a new 138 hp. "inclined" marine diesel, the new 87 hp. marine diesel and a diesel-driven generator set of unique design that requires no attention or maintenance other than normal servicing of the engine.

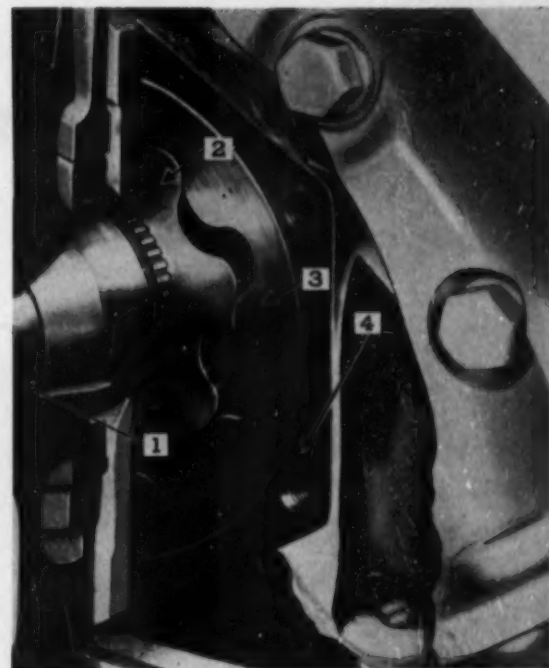
The inclined engine was designed to meet the current trend toward lower and sleeker pleasure craft and crew boats. It is an adaptation of the Division's series "71" four-cylinder engine in which very substantial reductions in height and weight have been achieved. In comparison to the conventional model, the height of the new engine has been reduced 9½ inches, largely through tilting the block and head 70° from the vertical. Its weight has been reduced 500 pounds through the extensive use of aluminum. The engine is available in either right- or left-hand rotation and in either case all accessories are located on the upper side. This affords easier servicing and is made possible because of Detroit Diesel's basic Series "71" design which has always permitted the installation of accessories on either side. At the Show, a matched pair of these engines installed in a section of a standard hull will demonstrate how they conform to the hull in actual installations.

The height of this engine from the centerline of the output shaft is 24¾ inches. It has an over-all width of 37½ inches with 24¼ inch bolt centers. The engine has three-point suspension with each contact point cushioned in rubber. The front bearer is a trunion support with rubber cushion ring, bolted to the crankshaft cover. Excessive torsional movement is prevented by a vertical snubber, affixed to the front cross member and the front engine cover. Heat exchanger cooling is featured in the engine with only fresh water reaching the block, head and exhaust manifold. The coolant pump is of the centrifugal type and the raw water pump is of the positive displacement type. The latter is an easily serviced Jabsco pump designed exclusively for General Motors Marine Diesel engines. A flexible coupling, located between the gear and the engine, cushions both from the shock of sudden load increases. The engine is provided with GM hydraulically operated marine reverse and reduction gears in ratios of 1.06 to 1, 1.5 to 1 or 2 to 1.

With accessories, the engine is rated at 138 hp. at 2100 rpm. using 80 mm. injectors. This is the first time injectors of this capacity have been used in Series "71" pleasure craft engines and their use is limited exclusively to this type of marine engine. As in all GM diesels main and connecting rod bearings are replaceable. Another important feature of the engine is the positive "metal-to-metal" sealing of the head and block introduced by Detroit Diesel over a year ago.

### New Permanent Magnet Generator Set

The new generator set is a product of both Detroit Diesel and the Delco Products Division of General Motors. It is driven by a two-cylinder model of the new "51" series engine and the weight of the generator itself is 40% less than conventional units of the same capacity. The total weight of the set is approximately 1200 pounds. It has an over-all length of only 37¾ inches. The rotating permanent magnet field is bolted to and revolves with the engine fly-

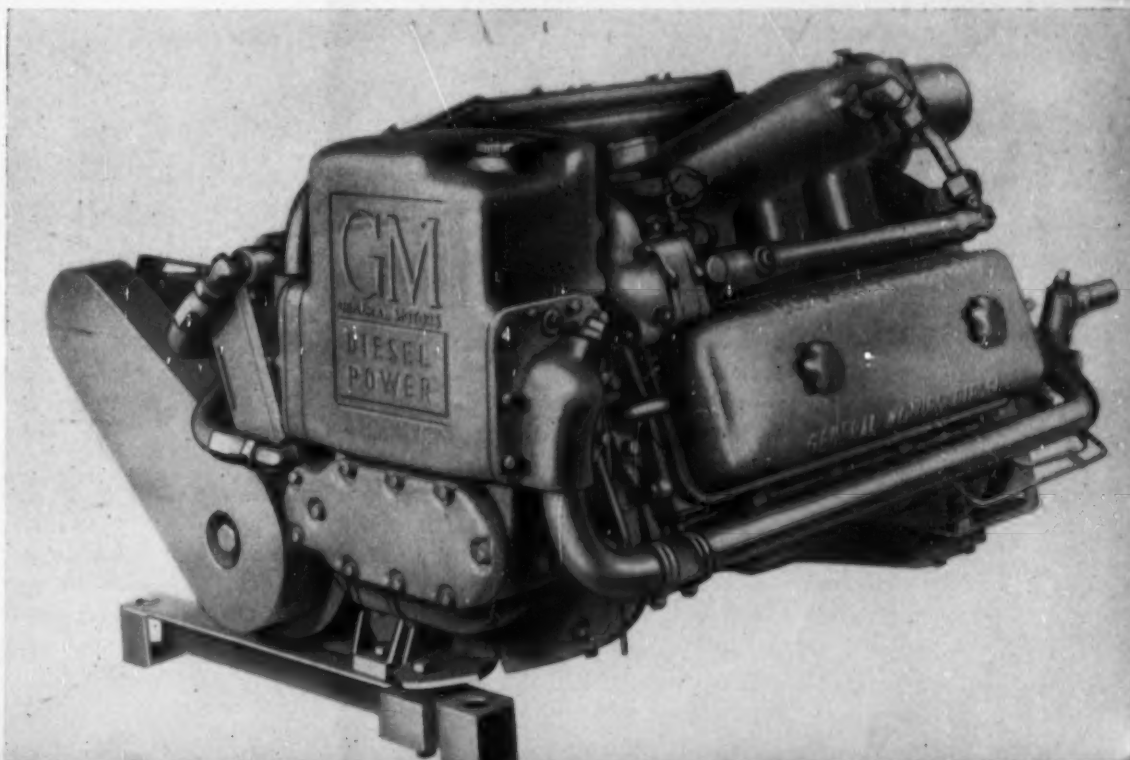


This is a cutaway drawing of the Series "51" lubricating oil pump showing its unique location on the crankshaft which eliminates the need for chain or gear oil pump drive. 1—Crankshaft. 2—Inner Rotor. 3—Outer Rotor. 4—Oil pump housing.

wheel while the alternator armature is bolted to the engine flywheel housing. This eliminates the need for bearings in the generator. Also eliminated in this type generator is the need for an exciter, commutator or collector rings. As the generator is self-regulating, costly regulating equipment is also done away with. The common causes of electrical failures are thus removed together with any need for periodic maintenance.

All three products will also be shown at the San Francisco Sports, Travel and Boat Show in March and will of course, be available for inspection in the display rooms of Detroit Diesel's Marine distributors and dealers throughout the country.

General Motors' new inclined Series "71" four-cylinder marine engine which is 9½ in. lower in height than the conventional vertical engine and weighs 500 pounds less through the extensive use of aluminum.

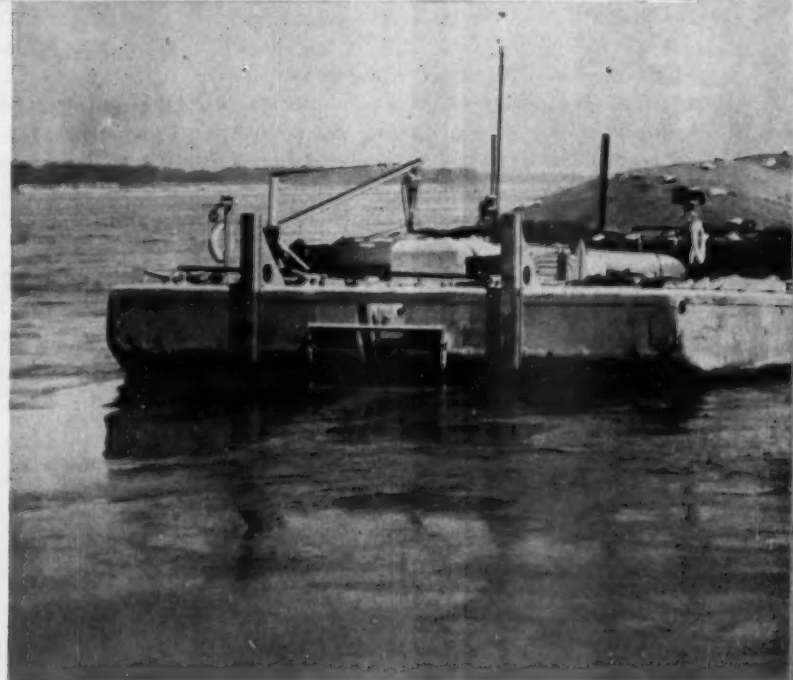




Stern view of the *Carpolis* showing the 300 hp. Harbormaster used for steering and additional power for steering.

## HARBORMASTER PROPULSION AND STEERING UNITS

By LEROY W. HAER



**B**EFORE the advent of Mr. Fulton and his steamboat, transportation on our great rivers was a comparatively simple matter. Logs were lashed together, a long sweep was fashioned at the stern, fending poles were cut, the cargo placed aboard and they were off. Sometimes the destination was reached. Things started to change with the coming of steam to the rivers. First the Packet Boat, then the first of the paddle wheel pushers, later the screw propeller boats, then diesel boats, all pushing great rafts of various sized barges firmly

lashed together. Some of these giant tows were over a hundred feet wide and from six hundred to a thousand feet long. Enormous loads, but slow. The steering rudders are ample and the flanking rudders, while not good, get by.

Then came the integrated streamlined tows, carrying less cargo at a greater speed. Their cargo amounts to approximately one half that carried by the slow moving tow. The new type of tow is made up of two, three, or four barges, strung out

in single file. They are built with a long easy rake at the bow, it rides the water rather than pushing it before the tow. These tows attain a speed, nearly equal to the old Packet boats and carry a cargo hundreds of times greater. With the new streamlined tows the steering problem becomes much more acute. Traveling at a pool speed of ten or eleven miles per hour, carrying seven to ten thousand tons of cargo up stream, or down stream light with the added speed of the current, takes a pilot of exceptional skill and experience to negotiate



the bends. Too much speed on a bend will land the tow on a bar or lay it on the bank.

Among the first to realize the dangers involved in operating the high speed tows was the head of one of our great inland shipyards. He spoke of the need for a method of bow steering eight or more years ago. Since that time he has worked out an installation which is doing just that. He uses a modified dieselized Harbormaster in the bow rake with controls in the pilot house. It was, however, Cargill of Minneapolis who first successfully used bow steering on their tow *Cartasca*. A 165 hp. diesel Harbormaster was installed in the rake of the leading barge, with controls running back to the pilot house, giving the pilot perfect control of the bow at all times. There are presently four tows equipped with dieselized Harbormaster bow steering units. These units allow the tow to take the bends at full speed without the constant hazard of landing in the willows.

The greater part of the new, fast tows are transporting oil. Most of them are about the same speed and carry approximately the same tonnage. The captains and pilots know their rivers, know how to take advantage of the slack water, and how to get the greatest number of miles per day out of their tows. With all else equal it was up to the builders to find a way to increase the speed of the tow. The one thing everyone with a knowledge of towboats has known for a long time, but about which nothing has ever been done, is the flanking rudders. They are inefficient, the rudders and deadwood act as a drag, cutting down the speed and preventing a full flow of water to the wheels.

The first of the modern towboats to operate without flanking rudders, was the *Cartasca*; powered with three 300 hp. diesel Harbormasters. It had no need for them as the propellers of the Harbormasters were capable of turning whether in forward or reverse. This, of course, provided the thrust for steering.

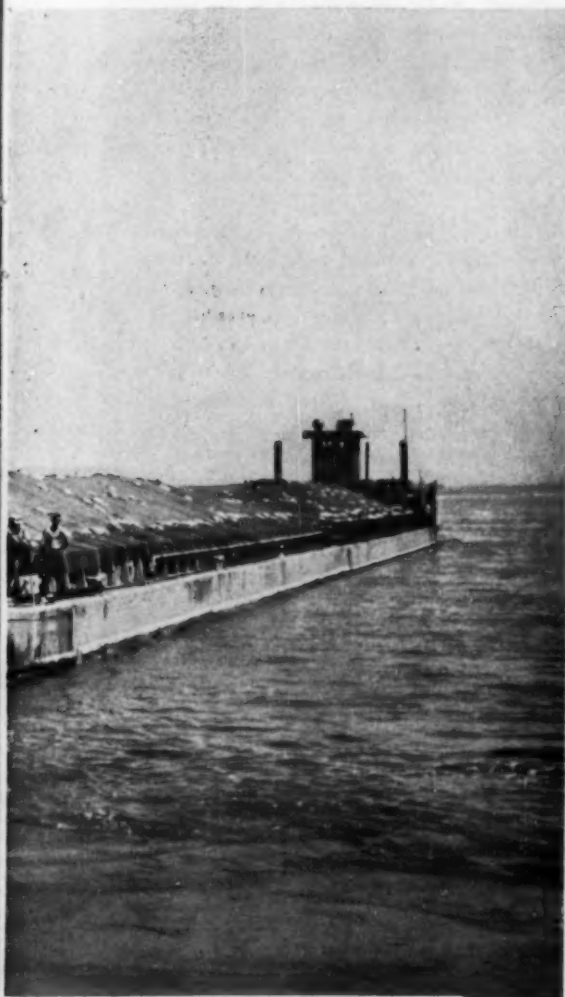
Recently the owners of the *Cartasca* came out with a new and novel tow. The wheels are set in side tunnels. The intake is from the sides rather than bottom as in conventional towboats. The wheels are equipped with modified Kort nozzles. There are no flanking rudders. A 300 hp. diesel driven Harbormaster set in the stern of the towboat, not only takes care of the flanking operation in a highly satisfactory manner, it also, with the help of a Harbormaster bow steering unit, steers the tow, and while steering provides an additional 300 hp. Added to the power of its main engines, gives

the tow a speed of ten miles per hour in pool water. The tow referred to is Cargill's *Carpolis*, 598 feet long, 43.6 feet beam, 1310 hp. with a displacement of 6000 tons.

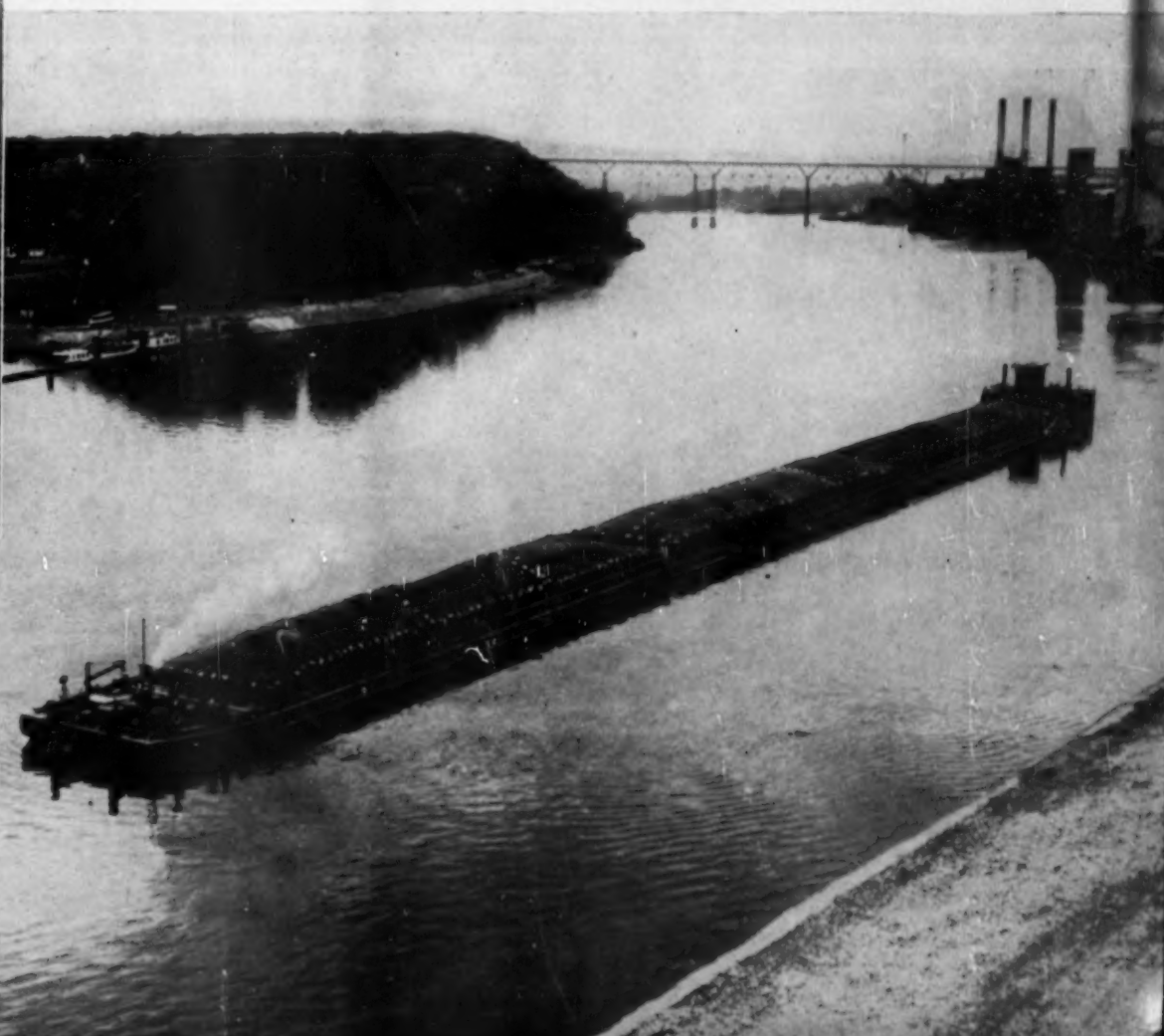
Within a short time an 1800 hp. towboat of the latest design will be put into service. A Murray & Tregurtha dieselized Harbormaster will be placed at the stern to function in lieu of flanking rudders. The builders expect to gain an additional one to one and a half mph. by eliminating the drag of the backing rudders, at the same time getting a more efficient means of steering in reverse. This installation is being placed on the first of four boats to be built for one of the river towing companies. A dieselized unit of 115 hp. is to be installed at the stern. This will be a "Guinea Pig" to determine the hp. needed to handle this particular type of tow.

Pictured on these pages is the M/V *Carpolis*, Cargill grain tow. The vessel has just completed an up-stream trip with a tow of 7200 tons of coal. Particularly note how the bow or nose piece of the tow has the 150 hp. Harbormaster, which is used for steering and additional pushing, set back in a slot for protection against being side-swiped or damaged by impact with another barge. Controls run back to the pilot house thus giving the pilot true bow steering.

The engines used on this installation are General Motors 6-71's. The Harbormaster on the stern is powered by a GM Twin and the bow unit by a single GM 6-71. The main propulsion engines are GM Quads. These photographs of the three barge tow were taken at St. Paul, Minneapolis.



Nose piece of the tow. Note the 150 hp. Harbormaster set in a slot for protection against side-swiping or impact by another barge.



The *Carpolis* with three loaded barges as she completed an up-stream run to St. Paul with 7200 tons of coal.

## TUNA CLIPPER "SEA-PREME"

**B**ACK in 1944 National Steel & Shipbuilding Corporation began with clipper hulls of modest size; since then, year after year, the company's naval architects and skilled workmen have turned out clipper after clipper to add to the prestige of Southern California's hook-and-line fleet. Each vessel in the succeeding program has been just a bit better in beauty of line, built-in strength of hull; efficiency and economy in operation of all the diverse and complicated mechanism of that "Eighth Wonder" in world fishing vessels, the modern tuna clipper.

*Sea-Preme* is Nassco's best to date—a clipper that Capt. George Stevens and the owners may well be proud of. She is not the ultimate in tuna hook-and-liners, for the future will see many more technological advances, but as of mid 1952, she is as good as they come. Nassco's own naval architects designed the new clipper, and as in the case of *Sea-Preme's* immediate predecessor, *Conte Bianco*, added a few more innovations to hull and layout.

Dimensions are: length 127 ft., beam 30 ft. 6 in., depth 14 ft. 6 in., molded height to raised deck 21 ft. 10 in. Duplicating the *Conte Bianco*, the hull of the new craft features longitudinal framing. The shaft alley is lined with 3/16 in. steel plate instead of the customary plywood; galley, on the main deck, is changed to go all across with passageway in center separating galley, refrigeration boxes, etc., from dining room. An unusual feature here is that there is access to upper engine room.

The pilot house, located on the third deck, has been extended to provide space for radioroom with

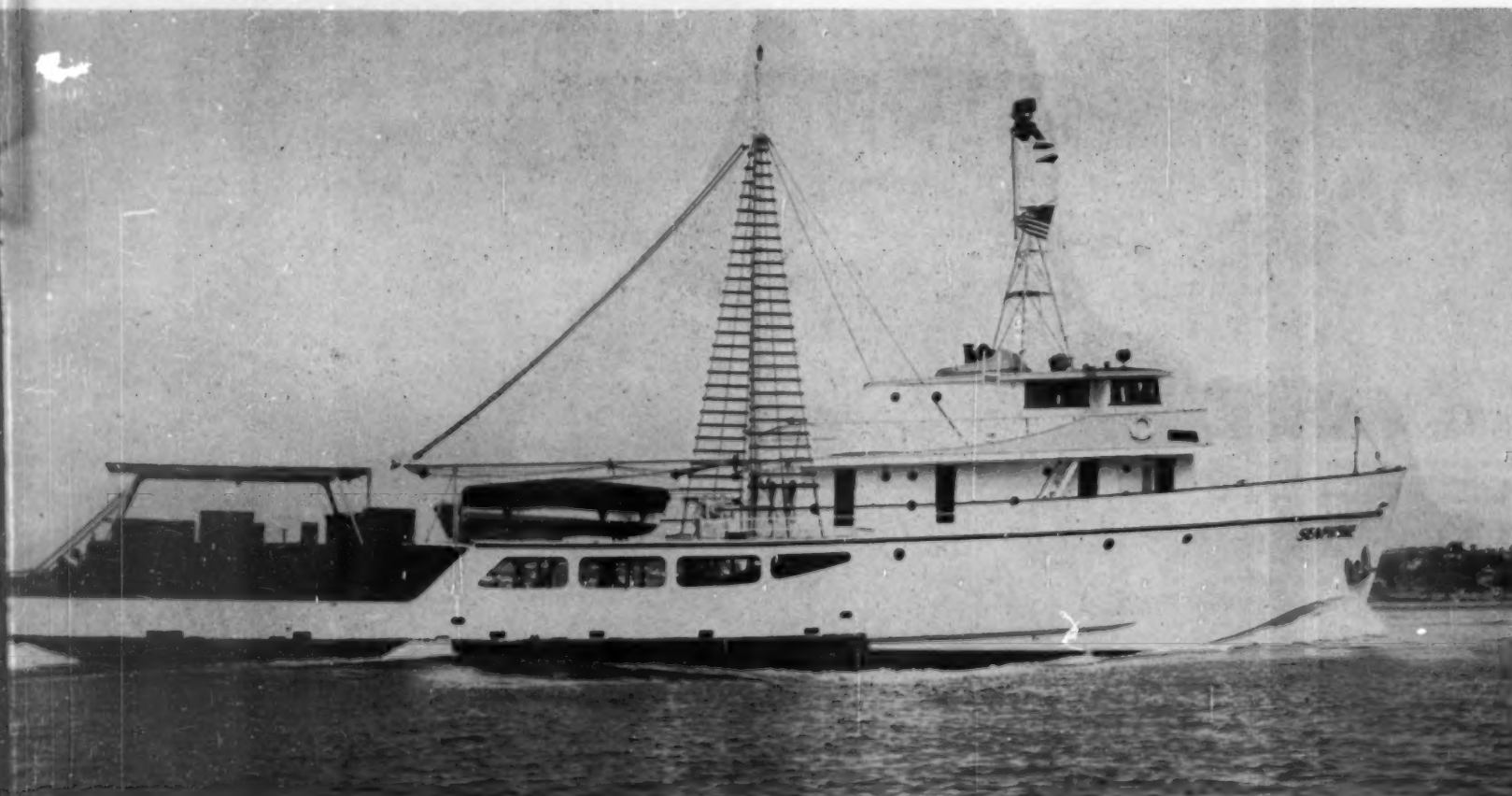
operator's stateroom. The clipper's tuna-cargo capacity is 330 tons, carried in 12 brine wells and three main-deck bait tanks. For wells ceiling is 3/16 in. steel plate over bottom, sides and bulkheads; 1/8 in. at deckheads. Baker Engineering Corporation, Los Angeles, supplied the refrigeration machinery of four 5½ by 5½ compressors, Model 8A Bakers, providing 100 tons of continuous refrigeration. The ice machines are driven by 30-hp. GE motors. There is an additional Baker Compressor for galley, ship's stores, etc., this is 2¾ in. by 2¼ in., 2 cyl. by 3-hp. GE motors. The Nassco condenser, welded and galvanized, contains 1¼ ammonia pipe.

Being essentially a water carrier, a tuna clipper's pumping system is very important. In the *Sea-Preme* there are no great pumps for serving the wells and tanks designated to keep schools of bait fish alive. Instead there is a combination bait and brine system, using 14-5 by 5 Pacific pumps. As bait pumps, water is drawn through 10 in. heavy pipe sea chest, one provided for each pair of pumps. Bait piping consists of 5 in. steel valve mounted directly on sea chest, with a short run of 5 in. pipe to the pump and a 5 in. discharge elbow into the well. Overflow valves, 10 in., are fitted in the eight wells used for bait. Brine circulation consists of 3 in. lines to discharge side of pumps reducing to 2½ in. A 2½ in. gate valve is provided in vertical line to regulate flow. The 5 in. by 5 in. centrifugal Pacific pumps are vertical type, bronze trimmed, Monel shaft, delivering 900 gpm. at 12 ft. head. Motors are 5-hp. three-phase, 60 cycle, 220 volt, alternating current. For all the various pumps circulation, bilge, general service, fire, lube trans-

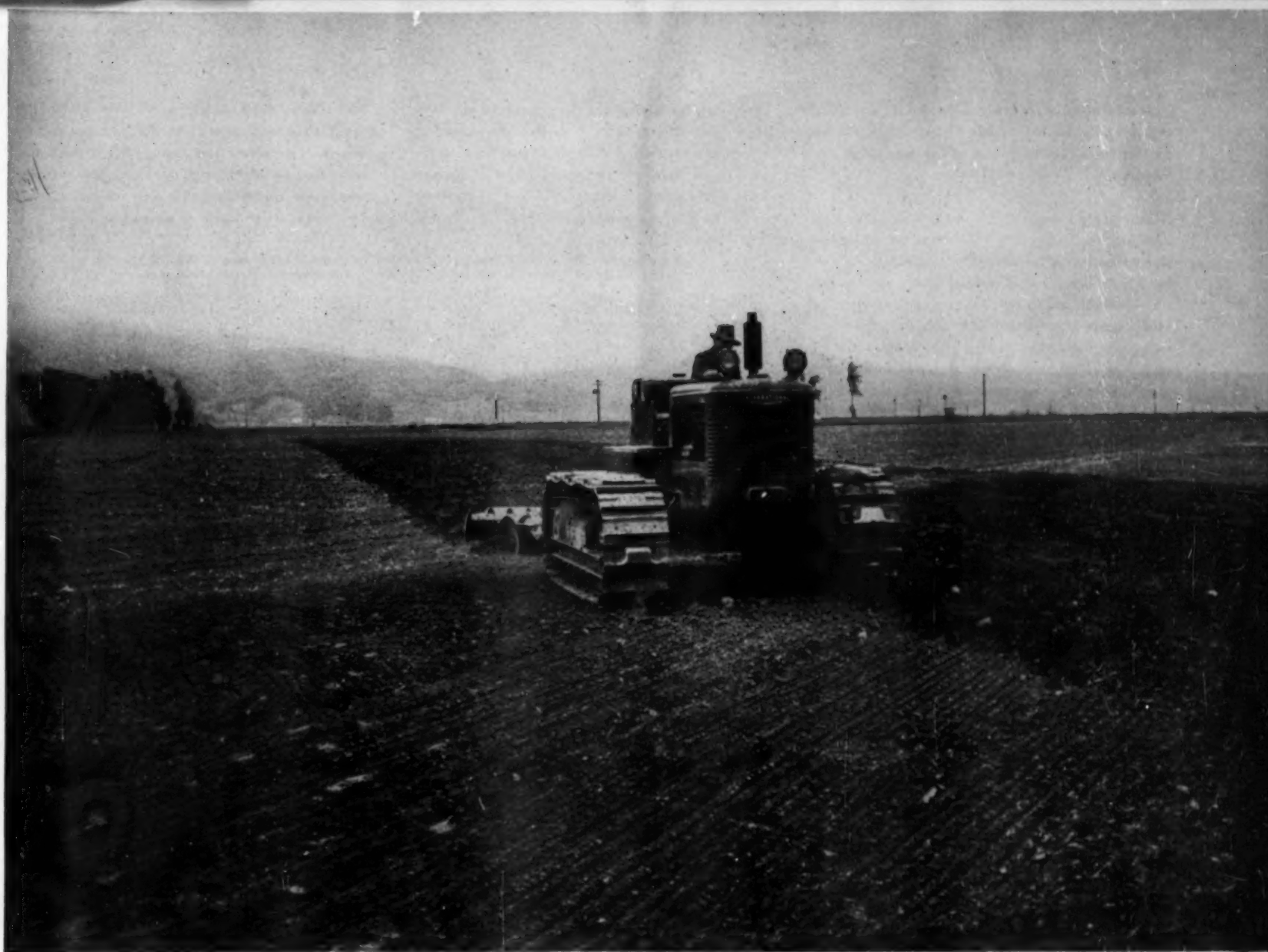
fer, etc. there are over 30 motors required, from ½-hp. to 25 hp.

For all the auxiliary requirements of a clipper such as the *Sea-Preme*, pumping, refrigeration, electronics, etc., a lot of dependable diesel-electric power is required. Such auxiliary power needs are met with two diesel-generating sets, mounted port and starboard of the propulsion engine. These are Murphy Model 122 diesels, 6 cyl. direct connected to 127-kw. 220 volt, 3-phase, ac. Electric Machinery generators; air starters by Leece-Neville. The Murphy plants are 4-cycle, delivering 200hp. at 1200 rpm. Propulsion power is a Model DMG-38, 8 cyl. Enterprise diesel, 12 by 15, 4-stroke cycle, direct reversing, 800-hp. at 400 rpm. The plant is fresh-water cooled. Tail shaft is Monel metal, 6¾ in. Bearings are Goodrich Cutless rubber, 7½ in. outboard and inboard. Propeller is by Lambie, Wilmington, California, 70 in. dia., 46 in. pitch, bronze airfoil type. Rudder of steel is "Contra-guide" streamlined to increase thrust. The rudder is offset in middle to pick up thrust from slip-stream of prop by counteracting motion of propeller water. Pyrometer on instrument panel is Alnor.

Control of the vessel centers in the pilothouse. A Sperry Magnetic Compass Pilot is the "seeing eye" for the helmsman, and with Sperry steering engine, from hydraulic power, with valves, gear-head motor and pump by Vickers. The clipper can be handled by remote control anywhere over the bridge deck by portable instrument. Submarine Signal supplied the 1000 fathom sonic depth finder, a "Fathometer." The vessel has radar and powerful radio-telephone and commercial wireless.







Farmer's Mercantile Company, International dealer for both full line farm and trucks, has done a great job in the Salinas Valley over the years. Here is an International TD 9 pulling Dyrr disk harrow in a beautiful seed bed preparation for a lettuce crop in the Salinas Valley.

## STEAM COOLING REPLACES ICEMAN

**Lettuce Producer-Shippers Develop New Process  
to Lift Quality and Increase Profits in the  
Vegetable Marketing Industry**

*By F. HAL HIGGINS*

**T**HE gay gambolier the writer knew as the "lettuce man" of a quarter century ago has developed into a daring engineer scientist who is now putting his industry on a sound business basis that insures profit for his time, money and management. The high point in this trend to take the gamble out of fresh vegetable production was seen by the writer on a recent visit to Watsonville where the local Texaco manager took him around to see the latest steps in "dry-pack" lettuce and the vacuum cooling plant that eliminates ice from his costs and worries. As this is written early in December the Vacuum Cooling Co. announces the opening of its third plant with plans for another pair in Arizona and California to increase its plant investment to over a million dollars.

The new cooling idea that started in 1948 has

proved itself to the smartest farmer-packer-shipper group in the world when it comes to programming its farming, packing and shipping to hit the big wholesale markets in steady stream of quality products. It's been a quarter of a century since the writer began visiting the lettuce growers and their operations in the Salinas, Imperial and Salt River valleys of the Southwest to study their mechanization. They were known as the fellows who would bet a 40-acre patch of lettuce on the roll of the dice at that time and the number who were broke one season and back on their feet the next with the downs and ups of the market was so high as to be mere comment among the tractor and truck men who knew them in their sales and service. As they have added diesel tractors, trucks, blade graders and all the tools that diesel engines powered to cut their farming and shipping costs, the big vegetable

growers have always been worthy of study and very close analysis.

"If you want to see the latest and the men who are putting it over, let us drive over to see Bud Antle," suggested the Texaco man as we talked over the problem of finding the top diesel story of the area. Over at the Antle office managers and superintendents were breezing in and out as they talked over operations, labor, equipment, markets and allied problems of the day. A short wait and we were introduced to the husky young fellow whose name appeared on lettuce crates, trucks and tractors that we soon ran across when we went out to the field where a crop of lettuce was being harvested by dry-pack methods and then hauled to the Vacuum Cooling Co. plant up the railroad siding on the edge of Watsonville. To get the prin-

ciple of the system developed by Rex L. Brunsing of San Francisco and managed by general manager Al Harder in the Vacuum Cooling Co. plants, let Harder tell it:

"The vacuum method of pre-cooling lettuce is here to stay. The principle of vacuum cooling has proved beneficial in two ways: Condition of the lettuce on arrival at the retail store; and its life on the shelf where offered to the consumer. In other words, there is a double quality value given the vacuum cooled lettuce over ice cooled. Ice burn and super-saturation of the lettuce are both eliminated. Frequent big losses came with the old ice pack handling on long trips. Bacterial action in the lettuce is also retarded. That other vegetables as well as lettuce will be pre-cooled in like manner is assured by trials and tests run to prove they belong in the system. It is a mere matter of waiting till there is sufficient capacity of vacuum cooling plants built to take care of all the lettuce. There will soon be five areas of vegetable production with vacuum cooling plants. These will be at Phoenix and Santa Maria and at Salinas and Watsonville. Vacuum cooling began at the H. B. Garin shed at Graves in 1946 in a pilot plant to prove the idea. Installations now operating or under construction will run plant investment to \$1,000,000.

"The new Salinas plant just completed and now in operation is the largest and most modern of all the Vacuum Cooling Co. plants. We have had the help of the progressive growers of this area to bring about this rapid expansion of the new processing plant. In 1948 when the first car of vacuum cooled lettuce left Salinas it was pure pioneering faith in this revolutionary process and the help of far-sighted Salinas shippers and buyers that started the ball rolling. A steadily growing demand that never ceased has carried the idea to this stage. The records show that over 13,000 carloads of vacuum cooled lettuce have been shipped since 1948; and 5400 cars has been shipped since Jan. 1, 1952."

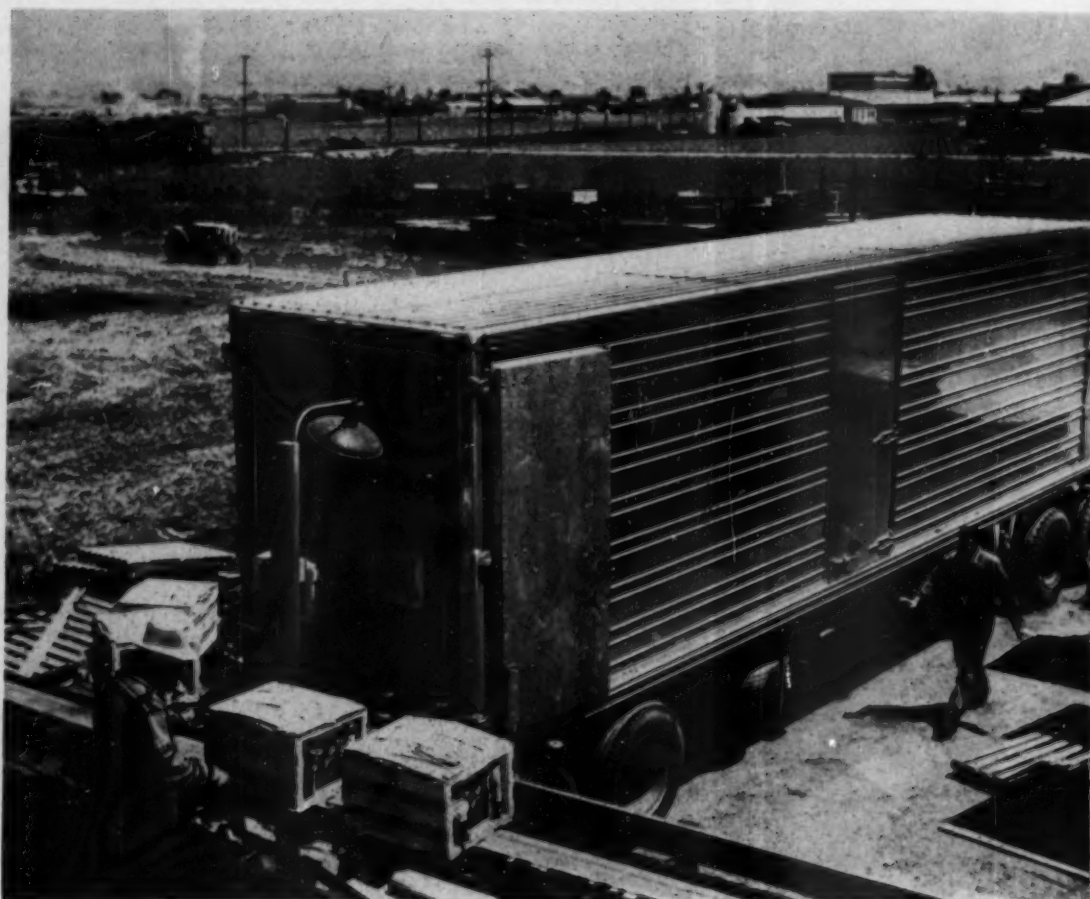
County Advisor A. A. Tavernetti, veteran of more than a quarter century in this area at that post, in a recent analysis of the lettuce market of Pittsburgh, Pa., finds that the transportation charges on head lettuce takes more than a fourth of the consumer's dollar spent for this salad foundation vegetable. Freight, icing and federal transportation tax are included. Over 90% of the lettuce sold in the Pittsburgh stores at the period covered by this study came from California and Arizona. Of the average shipping charge of \$2.03 per crate, 23 cents went for icing, \$1.74 for freight, plus a 6-cent tax. Freight charges have increased since this study. That is one big reason for the trend to refrigerator trucks with diesels for the big hauls. The visitor was able to catch two of the very latest Cummins dieselized trucks loading at one end of the Watsonville Vacuum Cooling Co. plant.

We spent more than two hours in the plant which has 3 vacuum processing chambers. Each chamber is 52 feet long and 7½ feet in diameter with track running through each for fork-lift truck hauling a train in and out loaded with crated lettuce on pallets as unloaded from the field trucks. At rear of plant is loading platform with room for three

big diesel trucks for the long haul moves from plant to the big markets. Now that the aluminum bodies are permitting 10% more pay load on the big trucks, they are beginning to haul loads of West Coast produce over mountains and deserts to the eastern and southern markets. The fleet of

Bud Antle's GMC trucks were being serviced by the Texaco truck as we left. Bud uses nothing but this line of greases and fuels and has stuck to it since starting in business. Servicing the vegetable business is big business that calls for fast, accurate and frequent service in fields and at shops.

Big aluminum diesel truck loading with steam vacuum cooled lettuce at rear of Vacuum Cooling Co. plant at Watsonville, Calif. Cummins engine; Kaiser aluminum.



Consignee Williams of Watsonville, Calif., delivers Texaco service at the plant of the Vacuum Cooling Co. where Bud Antle's trucks are parked. Here is the list of Antle equipment getting Texaco service: 9 trucks; 2 buses for hauling field labor; 1 airplane; 18 pieces of farming equipment including an Oliver tractor.

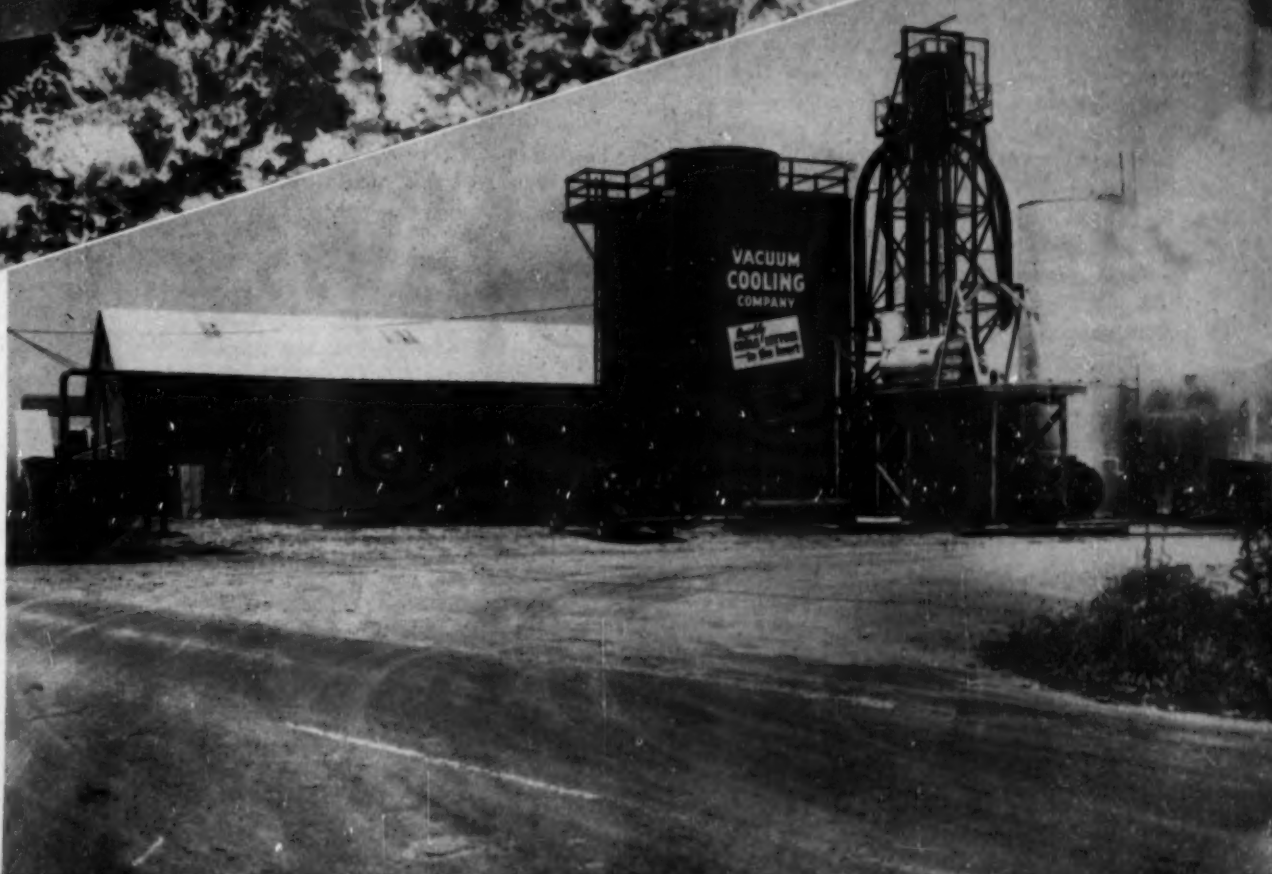






Bud Antle's field crew demonstrating how dry-pack lettuce is harvested. Left, packing the new paper box with fresh-cut heads. Right, closing crate with special stapler. Center, shows special squeezer for crates.

The Watsonville plant of the Vacuum Cooling Co., showing outer structure where the steam is generated. This plant was so busy last year, trying to take care of the lettuce-grower demands, that it was dismantled and set up in another area as the lettuce harvest seasons changed. Hence, the Salinas plant is not only more modern but bigger with 5 vacuum tunnels instead of two. Later a fourth tunnel will be added to increase its capacity.



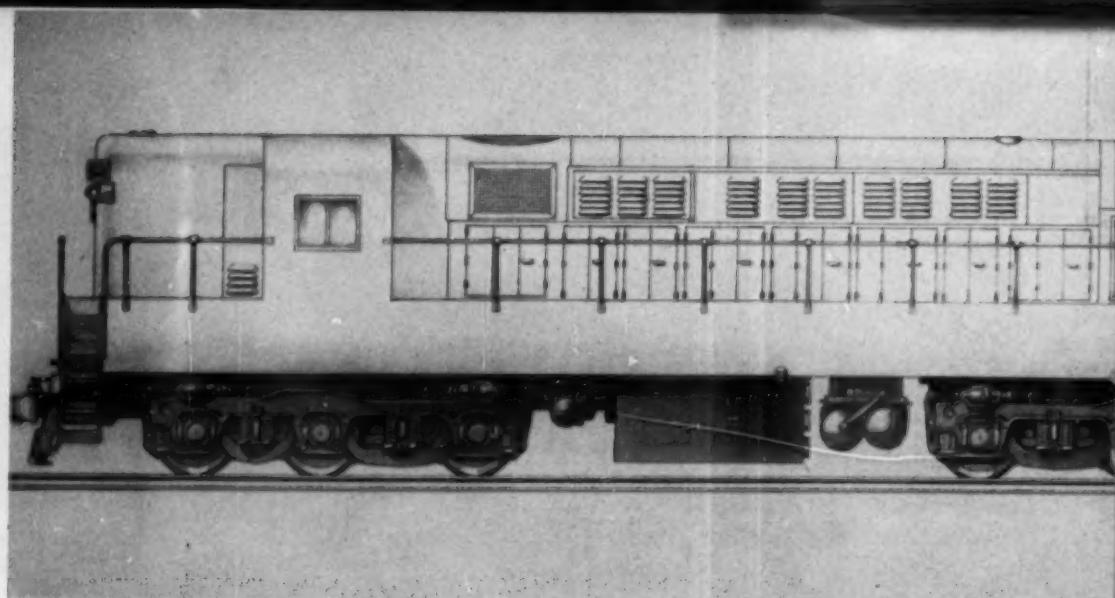
**T**HE world's most powerful single-engine diesel locomotive was recently announced. The new "Train Master," latest addition to the Fairbanks-Morse locomotive line, is powered by a 2400 horsepower diesel and is designed as a universal locomotive to handle a wide variety of railroad jobs, from 80 mph. passenger runs to high tonnage freight hauls. The first ten "Train Masters" to be built will be delivered to the Lackawanna Railroad. With the addition of these units at a cost of approximately \$2,500,000, the Lackawanna will be close to completion of its dieselization program.

The first year after World War II, i.e. 1946, steam locomotives handled 90% of all freight service—diesels handled 10%. Now, six years later, diesels are handling two-thirds of all freight being transported by rail, while steam power accounts for only 5%. In a few short years, the railroads—the nation's transportation backbone—have undergone a major change in motive power. The steam locomotive is fast disappearing. From the beginning railroads have been using the conventional 1500 or 1600 horsepower locomotive as the standard basic freight unit, and higher horsepower locomotives are assembled by coupling together two or more of these. In many cases this has not given maximum economy—for two main reasons. First, it is an expensive method of obtaining high horsepower locomotives, and secondly, in many cases one 1600 can't do the job, while two of them is an over-investment in motive power. A higher horsepower basic unit was clearly indicated. Fairbanks-Morse has responded with the 2400 horsepower "Train Master," the first of which will be completed early in 1953.

The power plant of the "Train Master" is the twelve cylinder, 2400 horsepower F-M opposed piston engine. The cooling, lubricating, and fuel systems as well as most of the working parts of the engine, are the same as those used on other Fairbanks-Morse locomotives to provide the maximum interchangeability of parts between the "Train Master" and other Fairbanks-Morse units already in operation on many American railroads. The main transmission components are taken directly from the 2400 horsepower F-M road locomotive models, and to this is added the driving power of two additional traction motors—for a total of six driving axles. This transmission provides the highest continuous tractive effort ratings per axle available for railway traction. Three optional gear ratios are available for selection of the most suitable range between maximum continuous tractive effort and maximum speed.

The ready-to-run weight available on all drivers of 375,000 pounds equally distributed to the six driving axles assures adequate adhesion for full utilization of the power in the "Train Master." Various combinations of equipment and ballast are possible to obtain the correct weight for the best advantage in starting and moving heavy trains over ruling grades. The capacity of the wheels to transmit force to the rails through friction is closely matched by the capacity of the transmission to develop continuous tractive force.

It is claimed that the "Train Master" provides



PERFORMANCE DATA	SINGLE UNIT LOCOMOTIVE	TWO-UNIT LOCOMOTIVE	GENERAL DIMENSIONS	SINGLE UNIT LOCOMOTIVE	TWO-UNIT LOCOMOTIVE
HORSEPOWER	2400	4800	OVERALL LENGTH	66 FT.	132 FT.
WHEEL ARRANGEMENT	C-C	2 (C-C)	OVERALL HEIGHT	15 FT.	15 FT.
STARTING TRACTIVE EFFORT AT 30% ADHESION	112,500 LB.	225,000 LB.	TRUCK CENTER DISTANCE	41 FT. 6 IN.	
CONTINUOUS TRACTIVE EFFORT AT 10 M.P.H.	72,900 LB.	145,800 LB.	TRUCK WHEEL BASE	13 FT.	
MAXIMUM SPEED WITH 63:15 GEARING (OPTIONAL GEARING AVAILABLE)	70 M.P.H.	70 M.P.H.	TOTAL WHEEL BASE	49 FT. 4 IN.	115 FT. 4 IN.
DYNAMIC BRAKE CAPACITY AT RAIL	3000 H.P.	6000 H.P.			

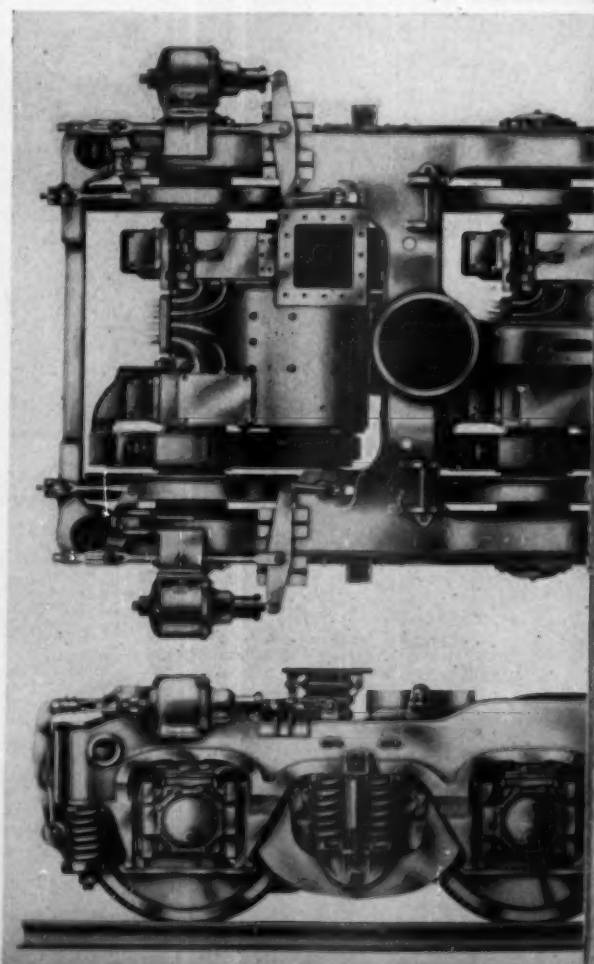
## THE TRAIN MASTER

By WILBUR

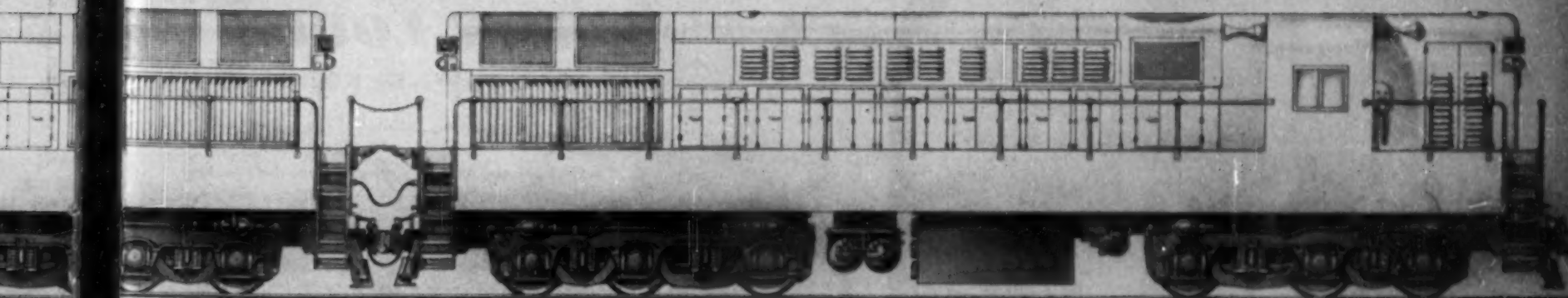
The new Fairbanks-Morse Tri-Mount locomotive has high tractive effort, high braking power, fewer

50% to 60% more power, 50% to 90% more continuous rating, and 50% more weight on drivers in a single unit as compared with a 1500 horsepower or 1600 horsepower four motor, four axle diesel locomotive now in service. Variable operating supplies have been arranged for equal distribution of weight on drivers. Fuel capacity is 1800 gallons, sand capacity, 48 cubic feet, train heating water capacity, 2400 gallons. These generous supply capacities are available without omission of any other equipment or function, and this emphasizes the care taken in the design for new achievements in versatility and utility. Train heating capacity of the "Train Master" expressed in terms of steam generator evaporative capacity is 4500 pounds of steam per hour utilizing the largest steam generator available for locomotive service. This capacity is adequate for comfortably heating up to 15 cars in zero weather. The station-to-station time for this combination of boiler and water capacity is more than is required on most railroads—a very important factor in all non-stop passenger train operation.

The Fairbanks-Morse Tri-Mount truck is a six wheel, three motor truck—the result of engineering effort directed at incorporating the finest known truck arrangement of proved components into a single truck. Features of this truck have been thoroughly tested and proved, not on selected locomotives or test cars, but in general heavy duty service on all types of motive power and rolling stock. The result is a truck that combines maximum tractive effort, high braking power, and three way







**THE FAIRBANKS-MORSE "TRAIN MASTER"**  
FOR MAIN LINE FREIGHT AND HEAVY PASSENGER SERVICE

TWO-UNIT LOCOMOTIVE	MAXIMUM OPERATING SUPPLIES	SINGLE UNIT LOCOMOTIVE	TWO-UNIT LOCOMOTIVE	WEIGHT DATA	SINGLE UNIT LOCOMOTIVE	TWO-UNIT LOCOMOTIVE	EQUIPMENT DATA	SINGLE UNIT LOCOMOTIVE	TWO-UNIT LOCOMOTIVE
132 FT. 15 FT.	FUEL WATER SAND	1800 GAL. 2400 GAL. 48 CU. FT.	3600 GAL. 4800 GAL. 96 CU. FT.	MAX. WEIGHT ON DRIVERS, FULLY LOADED (TOTAL WEIGHT TO BE ON DRIVERS) AVERAGE AXLE LOAD AT RAIL	375,000 LB. 62,500 LB.	750,000 LB. 62,500 LB.	12 CYLINDER F-M OPPOSED-PISTON ENGINE, MODEL 38 D 8½ TYPE 370 D TRACTION MOTORS 4500 LB. HR. CAPACITY STEAM GENERATOR JOURNAL BEARING SIZE, ROLLER OR PLAIN WHEEL DIAMETER	1 6 1 8½x12 42 IN.	2 12 2 8½x12 42 IN.

**Fairbanks-Morse Announces Most Powerful Diesel Locomotive. New Unit Capable of 80 Mile Passenger Service or Heavy Freight Hauls. Lackawanna Reports \$2,500,000 Purchase.**

W. YOUNG

Locomotive features three-way ride control, minimum of moving parts and maximum accessibility.

ride control with simplicity of construction, a minimum of moving parts, and most important of all, maximum accessibility.

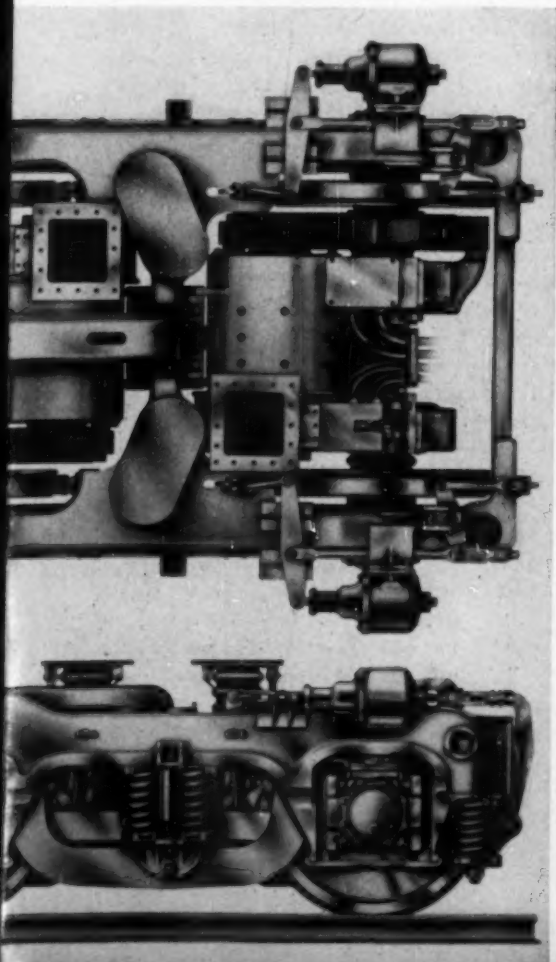
The general arrangement and construction of the "Train Master" is laid out to obtain the proved advantages of easier maintenance, better visibility and high degree of versatility of the hood type locomotive. Numerous doors offer access to all parts of the locomotive requiring service or maintenance. The hood type construction offers good visibility both forward and back. The inclusion of switchman's footboards, hand railings, and grab irons, etc., makes this locomotive available for use in those services requiring frequent switching.

All of the latest improvements in air flow, filtering and ventilation have been included in the "Train Master" design to assure clean, cool air for all air cooled or air consuming parts of the locomotive, thus improving all operating characteristics. The general arrangement is such that the short hood will be the forward end of the locomotive, affording maximum visibility. This is optional, however, and the reverse arrangement of cab control will be provided. Moreover, two control stations can be provided for operation in either direction from the right side in high traffic density areas.

In summary, the "Train Master" is a one and one-half 1600 horsepower locomotive. This 1½ ratio has been extended to include not only operating ability but also supplies. The high horsepower rating of this locomotive means a higher availability

than locomotives of the six motor, six axle arrangement because the "Train Master" can handle heavy trains with substantially less elapsed time between terminals and will therefore be available to make a larger number of runs per locomotive day. The high tractive effort capacity of this locomotive means that it can handle a 50% or longer train on a given grade at the same speed as compared with a 1600 horsepower four motor locomotive unit. The high dynamic brake capacity means increased control of heavy trains going down-grade—as a matter of fact, these trains can be controlled going down-grade faster than they came up, an important factor in moving today's high speed, tightly scheduled freight trains.

In conjunction with the increase in operating characteristics, the "Train Master" has only been increased 22% in length over that of any conventional 1600 horsepower locomotive. This increase in length has permitted the inclusion in the "Train Master" design of all the accessories necessary for its utilization in every type of service. This has been done, however, without making an unwieldy locomotive of the "Train Master." Instead, advanced engineering design has kept this locomotive extremely nimble in operation. It can operate well under conditions of sharp track curvature, and presents no special loading problem for normal road bed or bridge structures. It imposes just 89% as much vertical bending moment in the rails with a given road bed condition as a 1600 horsepower, four axle unit having the same weight per axle. It is claimed that two of these "Train Master" units, coupled together to make one 4800 horsepower locomotive equipped for freight service with dynamic braking, will cost about \$40,000.00 less than a 3-unit 4800 horsepower diesel locomotive similar in capacity, ratings, and equipment available today.





## M/V LOUISE

By W. L. BODE

**A**N outstanding addition to the inland waterways fleet is the new towboat *Louise*. This 900 hp. vessel has just entered the coal trade in the Paducah area for the Crounse Corporation. Designed and built by the St. Louis Shipbuilding & Steel Co., as was the other Crounse boat, *Alice*, the *Louise* is 90 feet in length with a beam of 24 feet and a normal draft of 6 ft. 9 in. The all welded steel hull is built on the longitudinal and transverse framing system. The bow is a modified scow type with easy lines aft to the well rounded tunnel.

Propulsion is provided by a General Motors, model 12-567 diesel engine developing 900 hp. at 750 rpm. The 75 in. diameter cast steel propeller turns at 300 rpm. through a 2.5:1 ratio Falk reverse-reduction gear with Airflex coupling clutch. Cooling of the main engine is accomplished by circulating the jacket water through the specially designed St. Louis Shipbuilding & Steel Co. skin cooling system. The main engine is equipped with a Hilco fuel oil filter, a Burgess-Manning exhaust silencer, and a Gardner-Denver air starting motor. The engines are also provided with General Motors mechanical-pneumatic pilot-house controls.

### List of Equipment

Main Engine—General Motors, Model 12-567, 2 stroke cycle, "V" type, 12 cylinders, 8½ in. bore, 10 in. stroke, rated at 900 hp. at 750 rpm.  
Exhaust silencer—Burgess-Manning.  
Fuel oil filter—Hilco.  
Lube oil purifier—Purolator.  
Air starting motor—Gardner-Denver.  
Mechanical-Pneumatic engine controls—General Motors Corp.

Governor—Marquette.  
Reduction gear lube oil pump—Tuthill.  
Tachometers (2)—Weston Electric Co.  
Air compressor—Quincy.  
Generator starting batteries—Gould.  
Generator exhaust silencer—Burgess-Manning.  
Storage batteries—Exide.  
Heating convectors—Trane.  
Reduction Gear—Falk with Airflex clutch.

Electric power is furnished by a 10 kw., 125 volt dc. diesel generator set and a 5 kw., 125 volt dc. generator driven off the tailshaft. There is one motor driven 10 cfm. air compressor and one 30 cfm. air compressor driven by the generator diesel. A ½ hp. motor driven Goulds bilge pump is provided with suction connections to all hull compartments. A ½ hp. motor driven Fairbanks, Morse & Co. pump provides for the efficient transfer of fuel oil between bunker tanks and day tank. There are two independent steering systems of the St. Louis Ship. standard mechanical-hydraulic follow-up type. One system actuates a Contraguide rudder and the other actuates two flanking rudders. The vessel's hot water heating system consists of an oil fired automatic boiler and a circulator furnishing hot water to Trane connectors.

The entire deckhouse of the *Louise* is insulated with 2 in. Ultralite #75 where outside surfaces are exposed. All surfaces in the quarters, galley and mess and pilothouse are sheathed with tempered masonite. The deck covering throughout all quarters and public spaces is Armstrong greaseproof tile. The modern galley is equipped with a Shipmate oil burning range, 10½ cubic foot Servel gas refrigerator and a double bowl stainless steel sink.

The pilot house is equipped with the latest advancements in river navigation equipment, including radar and radio-telephone, both by Radio Marine Corporation of America. From the console there is complete control of the main engine, steering and searchlights. On top of the pilot house are two Carlisle & Finch 14 in. arc searchlights with hand wheel controls, and one Kahlenberg D-2 duplex air horn. The powerful *Louise* is a valuable addition to the waterways fleet in the Paducah area and should give its owners many years of dependable service.





# FLORIDA KEYS CO-OP

**Despite Transportation Handicaps, This Generating Plant Continues to Grow While Decreasing Unit Costs**

*By* ED DENNIS

**T**HE Florida Keys: a tropical paradise in the southern-most part of the United States, is a panorama of endless miles of open sea dotted with some 700 odd keys, flanked on one side by the Gulf of Mexico, on the other, the Atlantic Ocean. Motor traffic literally "goes to sea" on this unique road called the "Overseas Highway" which stretches a distance of 122 miles from the Florida mainland to Key West, a city of over 13,000 inhabitants.

Here was played the scene in the drama of Henry M. Flagler's concept to link the United States, Cuba and Central America by railroad and ferries.

This undertaking left the financiers and the engineering world breathless back in the early 1900's, as he poured millions of dollars into the most spectacular rail-route ever built in America and took eight years to complete.

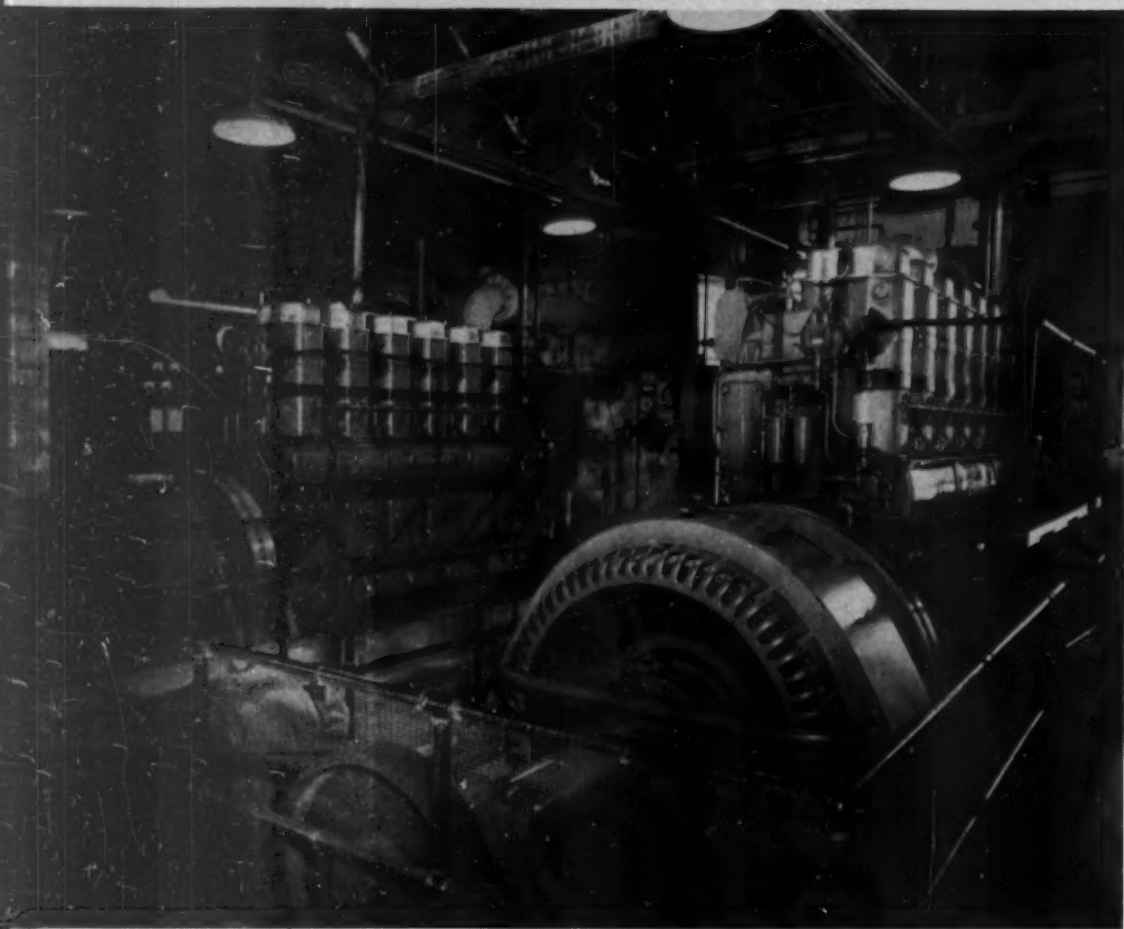
Anything in the line of permanent power plants on the Keys seems to date from Labor Day 1935, when perhaps the greatest hurricane ever to strike North America hit the keys with winds of over 200 mph. knocking out the sea-going railroad permanently. There was a small power plant at Tavernier on Key Largo, a type Y25 Fairbanks-Morse diesel

which served 37 consumers and only operated from 6 am. to 9 am. and from dark until about 10 pm.

Then in 1942 the Florida Keys Electric Cooperative Association was formed and took over the operation of the power plant putting it on a round the clock schedule. This was during World War II and the project as it was originally planned was to serve all the keys from Key West to Key Largo, but due to the scarcity of materials it was divided into three sections, 17 miles from Key West to Cojol Key, 7 miles on Key Vacca (Marathon) and 27 miles serving Upper Matecumbe Key, Windley Key,

Marathon, site of the proposed new power unit and end of the present power line of 150 miles, which serves 10 keys, crosses 12 bridges and 15 miles of open water. One of these viaducts is almost 3 miles long. Hurricane winds of over 200 mph. have been recorded here. The Atlantic Ocean is on the right and the Gulf of Mexico on the left.





Plantation Key and Key Largo including Tavernier.

The Key Largo section was energized in 1943 with three Superior diesel engines having a total of 275 hp. which were obtained from the Lee County Electric Cooperative at Fort Myers, Fla. The Key Vacca section (Marathon) was also energized in 1943 with an International diesel mobile unit model 2-UD 18, to serve 42 customers. This operation continued until 1946 when a tie line was built to connect the Key Largo and Key Vacca sections and to be served from the Tavernier plant. The association pulled through the next couple of years with the existing equipment, but the ever increasing demand for additional power always threatened them.

In 1948 it became apparent that the existing engines had too much difficulty handling the heavy loads, as the consumers had increased from 210 in 1943 to 743 in 1948 and with the new post-war influx of motels, fishing camps and permanent residents, a decision had to be made in a hurry, so it was decided to buy two more power units. In October 1948 two 650 hp. Enterprise diesel engines with Elliott Buchi superchargers directly connected to two Elliott generators rated at 450 kw., were installed and hurriedly put into operation just as the winter season started. The new units quickly demonstrated their value to the plant as the Cooperative was able to add more consumers to the existing lines. With the heavy schedule of the winter season of 1948-49 and with more and more motels being built, and more persons moving to the Keys, it became apparent that even the two new power units would not be able to keep up with the ever increasing load, and as Chief Engineer Bill Nichols said "The Enterprises really did a swell job and some times they were overloaded beyond their capacity but we needed more power."

The two Enterprise engines with Elliott 450 kw. generators and the Allis Chalmers switchboards for them.

The new and modern office of the Florida Keys Cooperative Association, Inc.



In 1951 with the demand for additional power still on the up-swing, the Cooperative officials decided to install two more power units, and chose two Elliott Buchi turbocharged Superior diesels, 14½ in. bore by 20 in. stroke, each rated at 1440 hp. at 360 rpm. with Woodward UG 8 governors and Ideal generators with a rated capacity of 1000 kw.

These two units went into service on August 8, 1951 and immediately started on a program of efficient generation. The four new units gave the Florida Keys Cooperative plant a total of 4180 diesel hp. with a generating capacity of 2900 kw. and gives the plant considerable flexibility in meeting various load demands, such as in the heavy winter season and in the lean spring and fall.

To August 31st 1942 the power plant in its report showed an annual peak load of 1820 kw. and a fuel consumption of 312,398 gallons of Standard #2 fuel oil A.P.I. 33.7, total kw. hours generated were 4,089,730 at a production cost of .0132 per. kw.

Present plans call for the conversion to "bunker C" fuel oil in the Superiors in the near future, which will further reduce the production cost. The lubricating oil used is Standard Gargole #3 and both engines have Hilco oil filters and reclaimers, a model F.C.A.-4 on one and a model H.F.C.-12 on the other. This method which uses heat, vacuum, activated clay and mechanical filtration to combat dilution and contamination of the oil has proven very successful. They batch the lubricating oil every 500 hours and send a sample to the Standard Oil Company for analysis, where among other



things the residue is burned to check for silver and brass from the engine bearings. Raw heat exchangers are used in the oil system to keep it at its correct temperature.

When this plant was visited the two Enterprise diesels had a total of 14,035 hours and the two Superiors had 6,775 hours. No major repairs have been needed. Bill Nichols, chief engineer, explained that some time ago they decided to adopt an engine maintenance schedule copied from DIESEL PROGRESS magazine and as a result they only have to do small minor adjustments such as compression check, tappet adjustments, etc. each 500 hours.

Due to the shortage of fresh water on the keys the Enterprise diesels had to use salt water for cooling, but in 1951 they were converted to a closed fresh water system using two horizontal Young radiators with Weinman pumps for circulation. The Superiors had a fresh water enclosed system installed with the engines using Young vertical radiators. Both systems use Fulton Sylphon control valves and Elgin Zeolite water softening equipment. Oakite is used when the water systems need cleaning.

The only source of fresh water outside of rain water on the Keys is the Navy's "Big Inch," an 18-inch water main which runs from Florida City on the mainland to Key West and the huge Naval Base, a distance of about 125 miles. This line depends on electrically driven pumps to send over four million gals. of water each day to Key West. At present the Navy is in the process of putting three new pumping stations within the jurisdiction

**TABLE I**  
**Florida Keys Co-Op, showing the increase in electric generation.**

Year	KWH.	Gal. of Fuel	Peak Load	Average Total Production Cost per KW ¢	Number of Customers	Percentage of Load Increase
1952	To Aug. 31 4,392,840	312,398	1820	.0132	1757	34% to 3rd quarter
1951	Gen. 4,089,730 Pur. 780,000 Total 4,869,730	312,752	1420	.0146	1526	1951—29% over 1950
1950	Gen. 1,941,910 Pur. 1,825,600 Total 3,767,510	155,253	1070	.0177	1102	1950—34% over 1949
1949	Gen. 676,890 Pur. 2,127,200 Total 2,804,090	52,710	920	.0183	937	1949—40% over 1948
1948	Gen. 22,287 Pur. 1,969,900 Total 1,992,187	4,040	625	.0196	743	1948—49% over 1947
1947	Gen. 728,512 Pur. 607,100 Total 1,335,612	85,740	440	—	536	1947—61% over 1946
1946	827,073	92,243	210	—	387	1946—36% over 1945
1945	600,500	77,400	190	—	324	1945—51% over 1944
1944	397,700	52,119	123	—	236	1944—38% over 1943
1943	287,850	34,009	107	—	210	

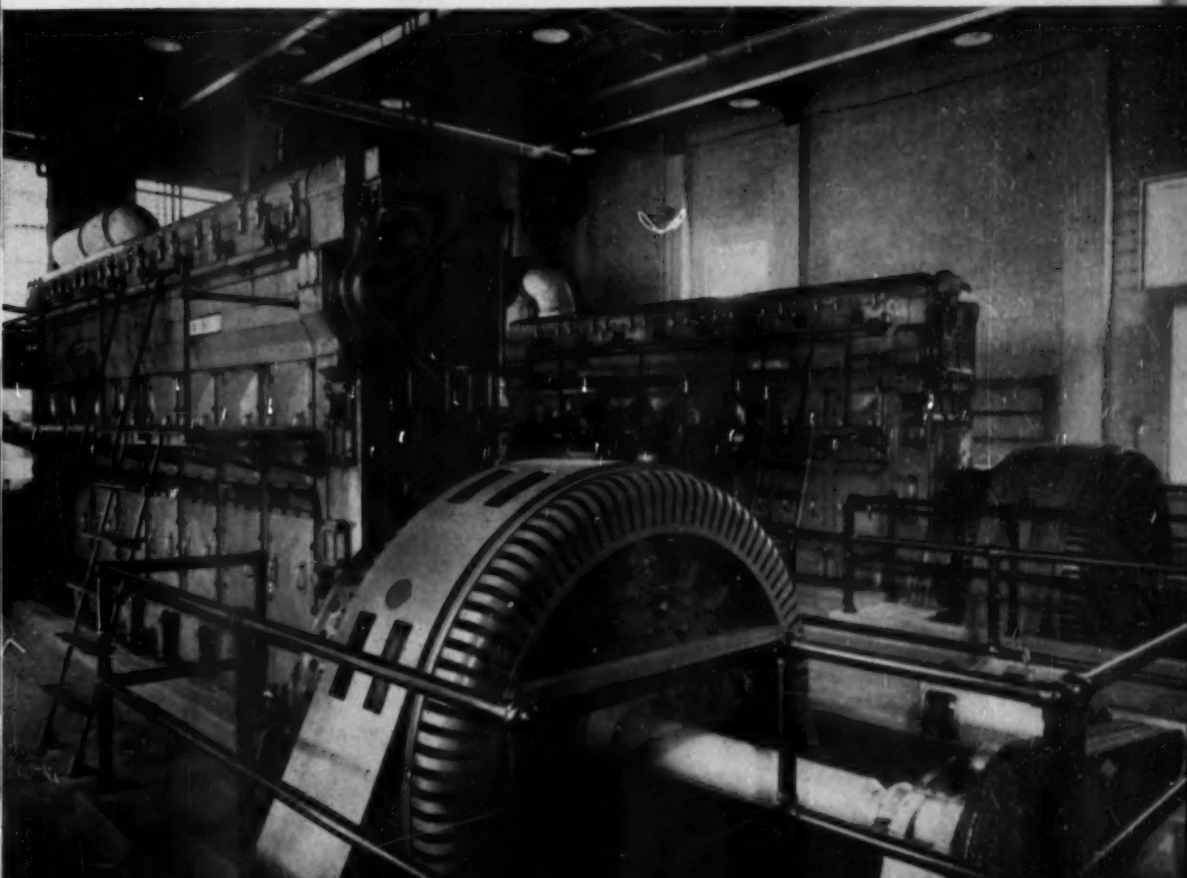
of the Florida Keys Cooperative to boost the capacity of the water pipe line to nine million gals. per day. Compressed air starting for the engines is provided by a Gardner-Denver air compressor.

Pyrometers on all engines are Alnor. Burgess-Manning snubbers handle the noise situation for all engines. Allis-Chalmers switchboards with GE electric instruments along with a GE percentage differential relay to protect it from short circuits. Alarms

are provided for high water temperatures, high lubricating oil temperatures and low lube oil pressure.

This winter season, 1952-53, they expect to go over the peak load and plans and specifications are now in the process of completion for a new expandable plant with a diesel in the 1000 to 1200 kw. class at the Marathon end of the line. Marathon is a town of about 1500 permanent residents now and con-

The two 1440 hp. Superior diesels with two Ideal 1000 kw. generators and 15 kw. exciters.





General view of the old and new sections of the power station, note the Hilco lube oil filters.



Rear view of the power house. Note the Burgess-Manning exhaust silencers for the Superiors and the Young horizontal radiators.

diesels in '48 and '51 there have been no interruptions of service along the keys.

The power house presents a clean and orderly appearance due to its system of underground piping to all four diesels. They have tried to engineer efficiency as well as safety in the plant and made every effort to assemble a highly competent and experienced staff. Mr. H. L. Martin is manager, William Nichols is chief engineer, and Warren Bland is construction superintendent. They also have their own radio station: KIC-626, and the field and construction crews are equipped with two-way radios. As this article is being written we hear rumors of a new power plant to be built on Summerland Key to connect with Key West.

sumes about 30 percent of the power generated.

When you consider that the Florida Keys Co-op plant is miles from the nearest railroad and that all fuel and supplies have to be trucked to this island, plus the high maintenance costs on its 150 miles of lines over 12 bridges, across 10 keys and

over 15 miles of open water, the over-all cost of distributing power is remarkably low. It is to be noted that during the hurricane of 1947 there was only a power interruption of four and one-half hours. This is wholly commendable as the author, living in the Miami area, was without power for over 5 days. Since the new installation of the four





Giant power on heavy job. Half a million cubic yards of impervious clay material will be taken from this pit for the clay core of Kenney Dam. The big International TD-24 crawler tractor with bulldozer pushes off the top layer of mud and muck in the foreground. Another TD-24, pulling a "rooter," (center) loosens the tight clay. A third TD-24 in the background is push-loading a 12-yard scraper.

## ALCAN'S NEW PROJECT

**Wilderness Area of Pacific Coast Transformed as  
Aluminum Company of Canada, Ltd., Pioneers  
New Frontier to Build World's Largest  
Aluminum Manufacturing Center**

**U**NTIL today, Canada's Pacific Coast has been known chiefly for totem poles, salmon, mining, lumber and mountain scenery. For along the coast of British Columbia, from Vancouver to Alaska, steep mountains rise abruptly from the ocean to snow-capped peaks. But today, up an ocean inlet that pokes its deep waters a hundred miles into the Coast Range mountains, an army of skilled men with twenty million dollars worth of construction equipment is working twenty to twenty-four hours a day on six separated, but interdependent, construction projects spread over 5000 square miles that will transform the economy of a frontier area and open it up to industry with the attraction of low-cost electric power.

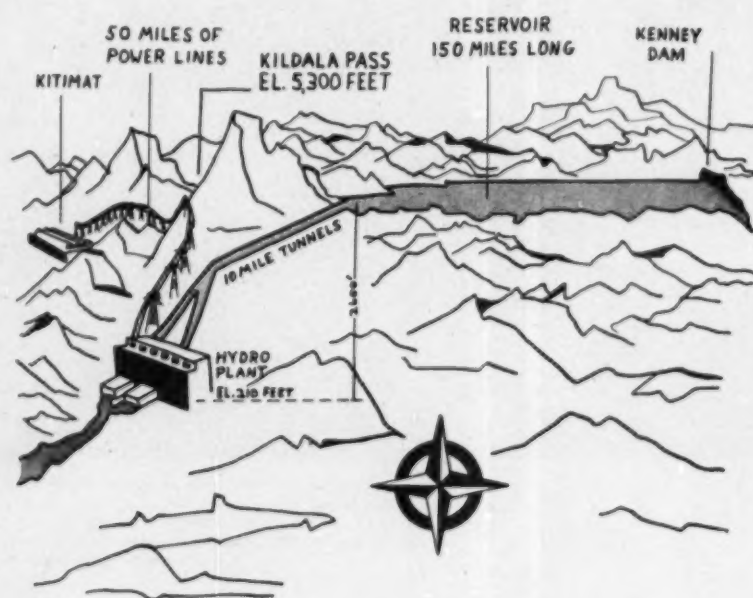
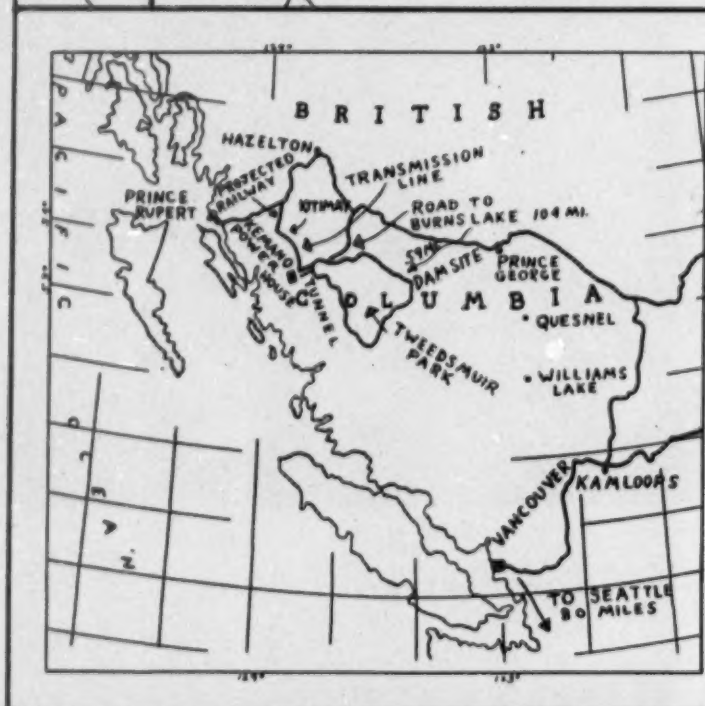
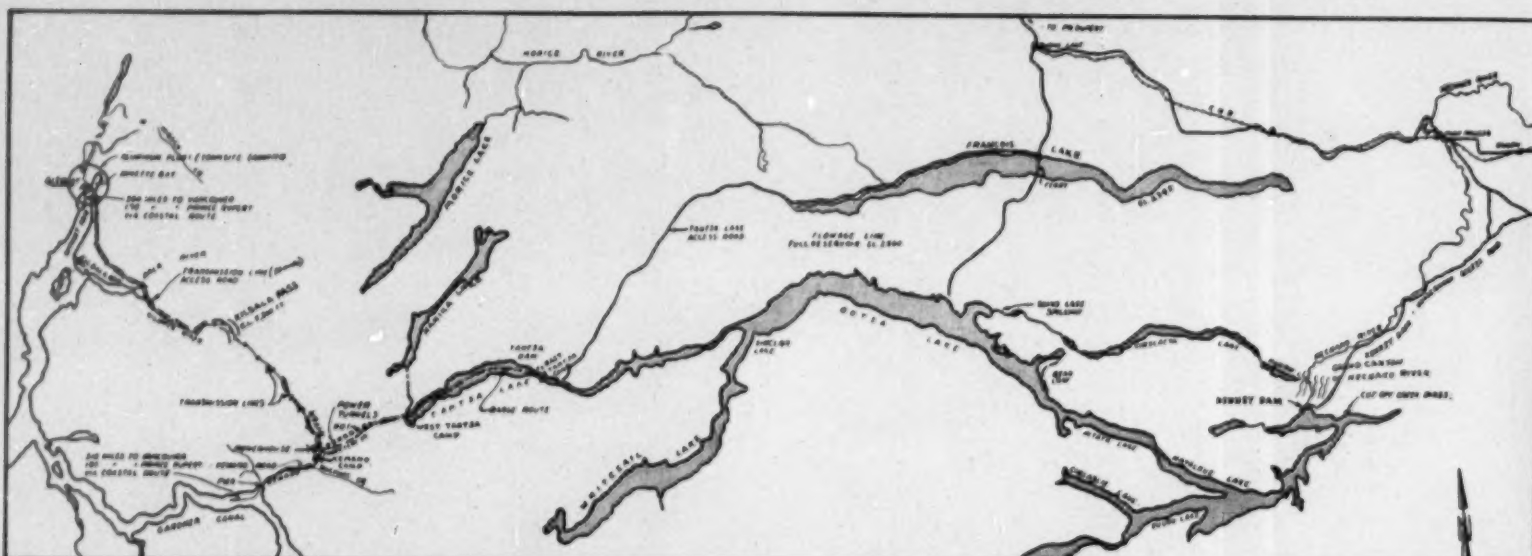
This is Project British Columbia. When completed, it will be the largest aluminum manufacturing cen-

ter in the world, run by one of the largest power plants ever built. The cost of the entire project is estimated at half a billion dollars.

Spread over 5000 square miles of wilderness, Alcan's Project British Columbia, four hundred miles north of Vancouver, is about 175 miles from Kenney Dam on the east to the powerhouse at Kemano and the smelter and town site of Kitimat on the Pacific Coast—with a forbidding range of mountains in between. Here an army of men with twenty million dollars worth of construction equipment is pioneering the new frontier to (1) build the largest sloping clay core dam in the world; (2) fill a natural reservoir of lakes and rivers draining an area as large as Connecticut; (3) make the water run backwards and channel it through a tunnel 10 miles long through a mountain; (4) drop

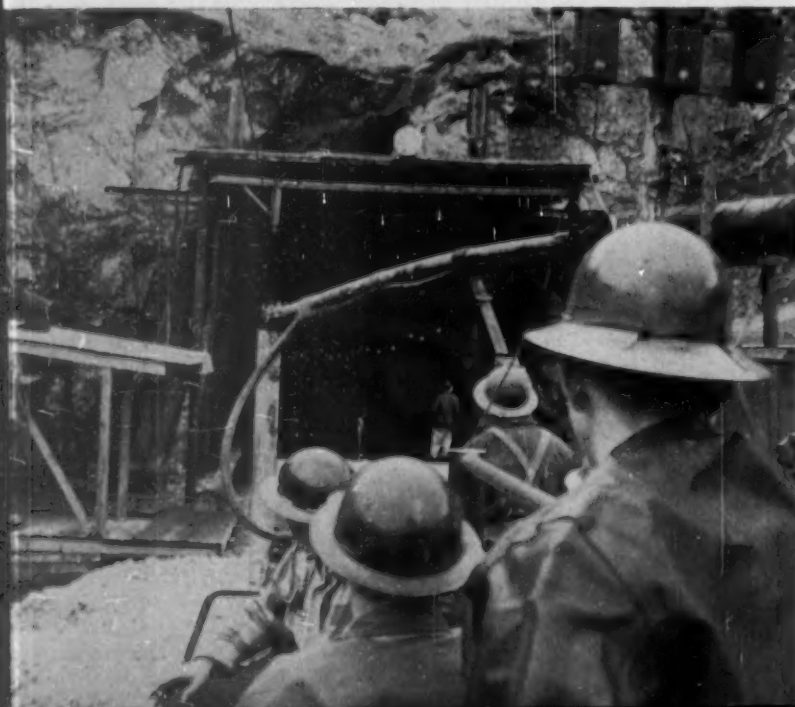
the water from a height 16 times as high as Niagara and through one of the largest power plants in the world, constructed inside the mountain; (5) flash the electricity created in the powerhouse over a 50-mile transmission line over mountains, snow fields, and glaciers; and (6) power an aluminum smelter two-and-a-half miles long at a brand new deep water port and an eventual city of 50,000.

Because aluminum production takes tremendous quantities of electricity, vast amounts of power are needed to produce it economically. And in British Columbia, nature has combined the two main ingredients of hydroelectric power—great water storage and great height—in a matchless way. By developing electric power from this water, aluminum can be made by utilizing a natural resource otherwise completely wasted.

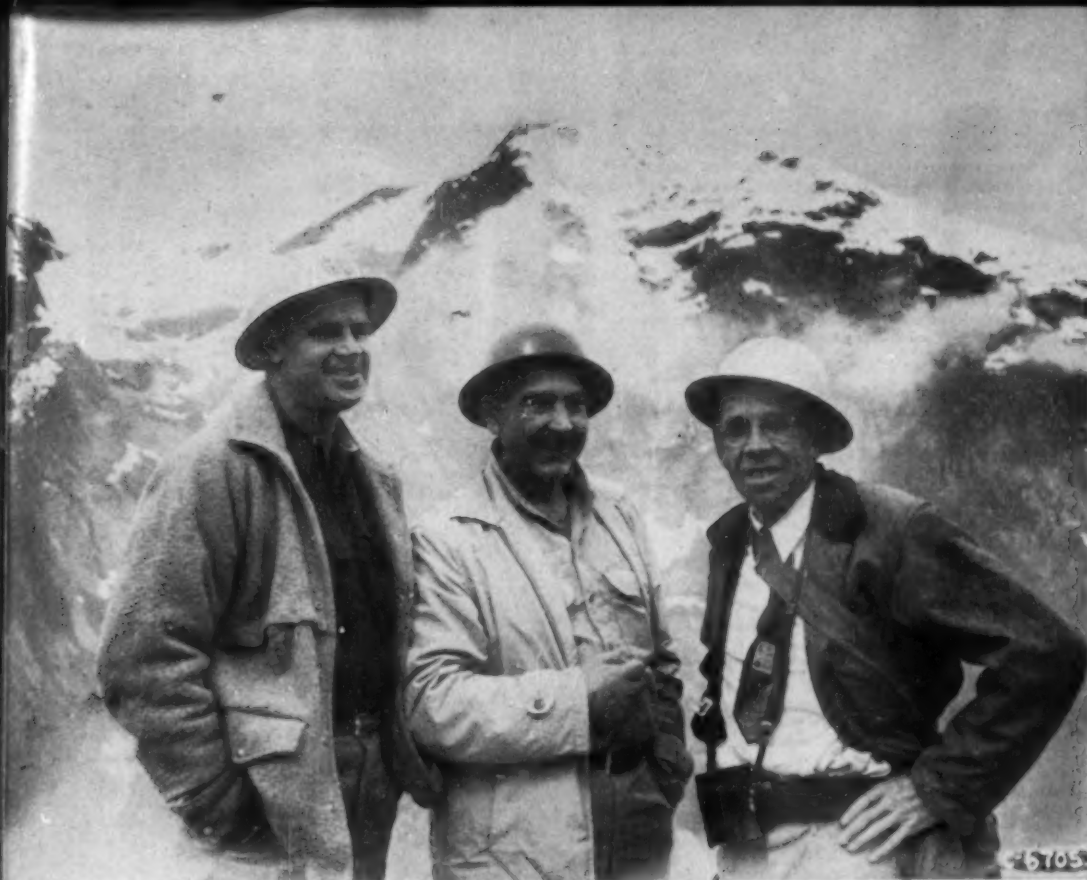


A hundred miles west of dam, miners are driving a tunnel 25 ft. in diameter, ten miles through the mountains to carry the water from the reservoir to the powerhouse. Work is proceeding from four separate points. The opening at West Tahtsa (shown here) is the principal water intake. High in the mountains on the other side of the range, crews are drilling in both directions—east to meet the Tahtsa tunnel, and west to meet another crew drilling up from the coast. The actual meeting of the tunnels will take place within the mountain—pinpointed to the inch.

Most spectacular phase of project is "airlift" by helicopter, supporting mountain-top camp needed for construction of transmission line. International TD-24 crawler tractor worked its way to top of mountain pass over bridge of packed snow just before spring thaw. Now isolated camp is supplied with everything from lumber and diesel fuel to chocolate bars and tea by helicopters, operating with greater frequency than planes did in Berlin airlift. Here a helicopter brings in supervising engineer, as tractor crew "gases up" with can of diesel fuel previously dropped.







Veteran construction men at Project British Columbia include (left to right) A. O. Strandberg, project manager for prime contractor Morrison-Knudsen Company of Canada, Ltd., and F. T. Matthias, assistant project manager for Alcan, and Walter Abrahamson, assistant resident engineer at Kemano for Alcan.

By 1954, lakes, over half-a-mile high, draining an area as large as Connecticut, will be dammed up and diverted through a subway-size tunnel running ten miles through the heart of a mountain. After a tremendous drop—16 times as high as Niagara Falls—through sloping steel shafts inside the mountain to near sea-level, these waters, under terrific pressure, will surge through an eight-story powerhouse cavern deep in the mountain. Electrical energy from this powerhouse, the largest single generating plant ever built, will be carried through steel and aluminum cables 50 miles over jagged mountain ranges and glacial snows to a new ocean port and the huge smelter at Kitimat, the nearest site where topography offers the chance for an ocean port and enough comparatively level land to build a smelter two-and-a-half miles long and a town to support it. Project British Columbia is the largest integrated engineering program in history.

When it is completed, an uninhabited, mountainous wilderness that hadn't even been completely mapped may become a great industrial center of North America, supporting a city of 50,000 people at Kitimat and opening up the whole underdeveloped heart of Central British Columbia, an area as big as France.

Shoving the shot rock, an International TD-24 dozes a big chunk of rock into position to be picked up by Marion shovel and loaded into Euclid dump truck for speedy trip to dam. Chunks are as big as 20 tons. Rock has been broken off ridge top above dam site by blasts with as much as 200 tons of dynamite each. All equipment shown is powered with diesels.

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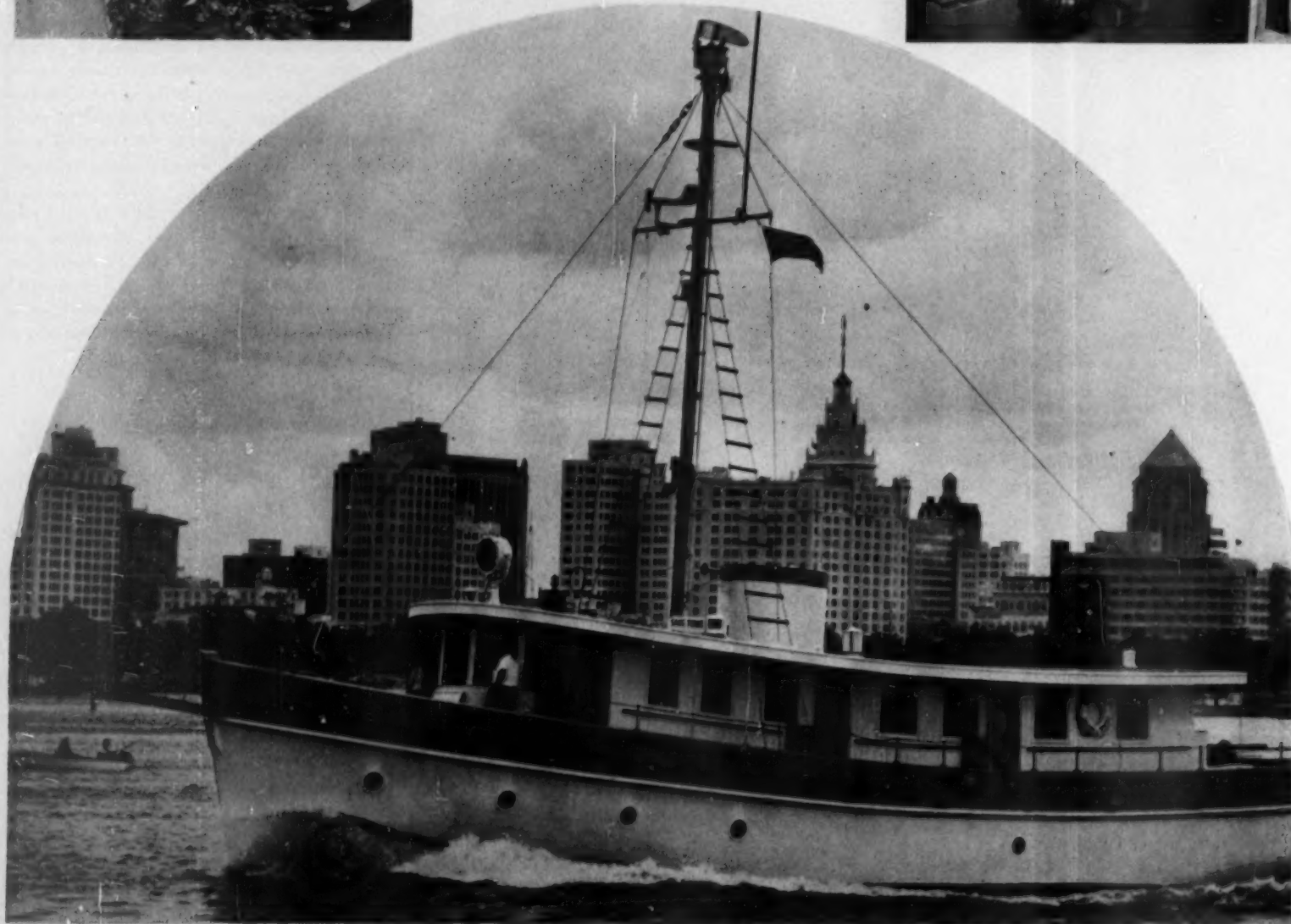




Left to right: Mr. Thorne Donnelly, Chicago publisher and owner of the *Sans Terre*; Mrs. Thorne Donnelly who christened the new yacht; Mr. Gene Buehler, marine superintendent of Miami Shipbuilding Corp., builders of this fine craft.

The engine room showing the D 364 Caterpillar diesel, Ross heat exchanger and switchboard for the Kato lighting system. Engineered by Shelley Tractor & Equipment Co.

The *Sans Terre* of Riviera Beach under way on her trial run, showing the City of Miami in the background.



## THE "SANS TERRE"

By ED DENNIS

IT was hull #489 when I first saw the *Sans Terre*, at the Miami Shipbuilding Corp. It was a shrimp trawler hull but was to be outfitted as a yacht. Designed for luxurious living afloat, no expense was spared by Mr. Thorne Donnelly, a Chicago publisher, to make this 73x18 ft. craft what he wanted: "a yacht that could really take it."

The pilot-house is separate from the lounge and contains Westinghouse controls to the engine room, a Bendix marine depth recorder, a range finder and a dozen other navigational aids. The galley is ultra modern and has of all things a General Electric disposal sink; a dish washer, a Philco refrigerator and a #12 Philco deep freeze.

The walls of the lounge are lined with knotty pine. They have a television set and radio and the furnishings are in true nautical style. Aft of the lounge is a twin bed stateroom. Below and up forward is the crews' quarters, and aft of the engine room are the showers and head, plus two two-bunk staterooms.

The engine room contains a model D364 Caterpillar diesel and both the main engine and the 10 kw. Buda generating set are equipped with low lube oil and high water temperature alarms. Other equipment in the engine room includes a Quincy air compressor, Viking bilge pump, Ross heat exchanger, Purolator fuel filters, Twin Disc clutches,

2000 gal. fuel tanks, Kidde fire control system, 3:1 Snow Nøbstedt reduction gears, a Worthington air compressor and 2 Kato 5 kw. dc. generators driven off the main engine. The engine room walls and overhead are sound proofed and the whole ship is insulated with Gold Bond rock wool. John Nielsen, the engineer, is really proud of his engine room.

During the 4 day trial run to Key Largo, Mr. Loyd Anderson and Mr. Rudy Lenich, Caterpillar factory representatives, along with Bob Mitchell and Steve Darlington, Shelley engineers, watched every detail. Her speed on the measured mile was clocked at 10.7.



# MASCOUTAH, ILLINOIS

**This Municipality Turns to Diesels and Finds Them Highly Economical and Efficient**

*By* LEO F. KOBERLEIN\*

**T**he City of Mascoutah, Illinois has turned to Diesel engine generating units so as to reduce costs in its municipal power plant. This move was necessary in order to keep down operating costs and put the system on a sound financial basis, as well as to furnish power at reasonable rates. Mascoutah is located in St. Clair County, Illinois, about 30 miles southeast of St. Louis, Missouri. It has good highway and railroad transportation facilities, and typical of many smaller cities near large metropolitan centers, has several small industrial enterprises and manufacturing companies. In addition to being employed locally and in nearby coal mines some citizens drive to nearby Belleville and the Greater St. Louis area for employment. Within the past 10 years Mascoutah has expanded at a surprising rate, far exceeding that of other nearby cities. The present population is about 3500 representing an increase of over 30% during the past decade. Part of this increase is no doubt due to Scott Air Force Base which is about 5 miles away. This Base is the headquarters of Air Training Command and also of the Air Force communications school. A number of air force personnel and civilian employees reside in Mascoutah.

Recognized as a pioneer in municipal ownership the Mascoutah system was held up as a model installation and many city-owned utilities were patterned after it. Light and power have been supplied by the city plant for over half a century. The plant used steam engine generating units for a number of years, and this is not surprising as they were dependable and at that time were economical units. Mascoutah is favorably situated in regard to coal supply, and until recent years it was an economical fuel. During these years the system had a reputation for making money and furnishing electricity at reasonable rates. Even though the people didn't realize it their troubles

started at this time. As has been the case of many municipal utilities it was an easy matter to direct the surplus funds and use them for other municipal purposes, instead of building up a cash reserve for future expansion and replacement of equipment as it became obsolete or too small.

After World War II the generating facilities consisted of two reciprocating steam engines and two boilers. The engines were Hamilton Uniflows, operating non-condensing, one driving a 200 kw. generator and the other a 400 kw. generator. The boilers were equipped with chain grate stokers and operated at a steam pressure of about 150 psi. These units became overloaded and in 1946 an expansion program was initiated. Because of the steam plant's past record and the availability of coal, a new steam plant consisting of boiler, 1000 kw. turbo-generator, building and accessories was constructed. This equipment did not solve the city's problems, even though it did operate more efficiently than the steam engines. The increasing costs of fuel, labor, etc. and the requirements to pay the bonds and interest on the revenue bonds, issued for the improvements demanded more money than the city received. Two rate increases were made but they failed to put the system on a sound financial basis. The peak load was rapidly increasing and reached the maximum capacity of the turbine. The plant, therefore had no standby unit and steps had to be taken to get the city out of a situation that was fast becoming serious.

In order to obtain technical advice on this problem the city engaged the firm of Russell and Axon, Consulting Engineers, of St. Louis to study the entire municipal power plant problem, including the financial aspects, and report to the city with recommendations. As a result of these studies, it was determined that diesel engine generating units

would be more economical than additional steam equipment, in both first cost and operating costs. From an engineering standpoint, the installation of 3 diesel units would have been desirable. This would have provided one unit for light loads, two for peak periods with the third a standby. However, a check of the financial situation immediately showed that it was not possible to issue and sell the required amount of electric system revenue bonds. The financial studies indicated that the estimated net earnings of the system would provide funds to pay the interest and principal on the bonds previously issued and on \$160,000.00 in second lien bonds to be issued for diesel equipment. These were issued at an interest rate of 4%. Bids were received in August 1950 and a contract awarded to Fairbanks, Morse & Company for two Model 33E14, 7 cylinder units, rated at 805 bhp., each with alternators having a capacity of 556 kw. at 80% pf.

The new diesel units were installed in the original boiler room, so as to keep down construction costs. One of the two Erie City boilers was removed and only a minimum amount of work was required to make the building suitable. The second boiler is now being removed and this will provide space for a third and larger diesel unit. A new steel, fuel oil storage tank was installed. The piping is arranged so that oil can be unloaded from either tank cars on the railroad siding or from tank trucks with a motor driven pump of 55 gpm. capacity. The fuel oil is transferred to the two day tanks by a motor driven rotary pump of 10 gpm. capacity. It is filtered through a Hilliard Corp. cartridge type filter.

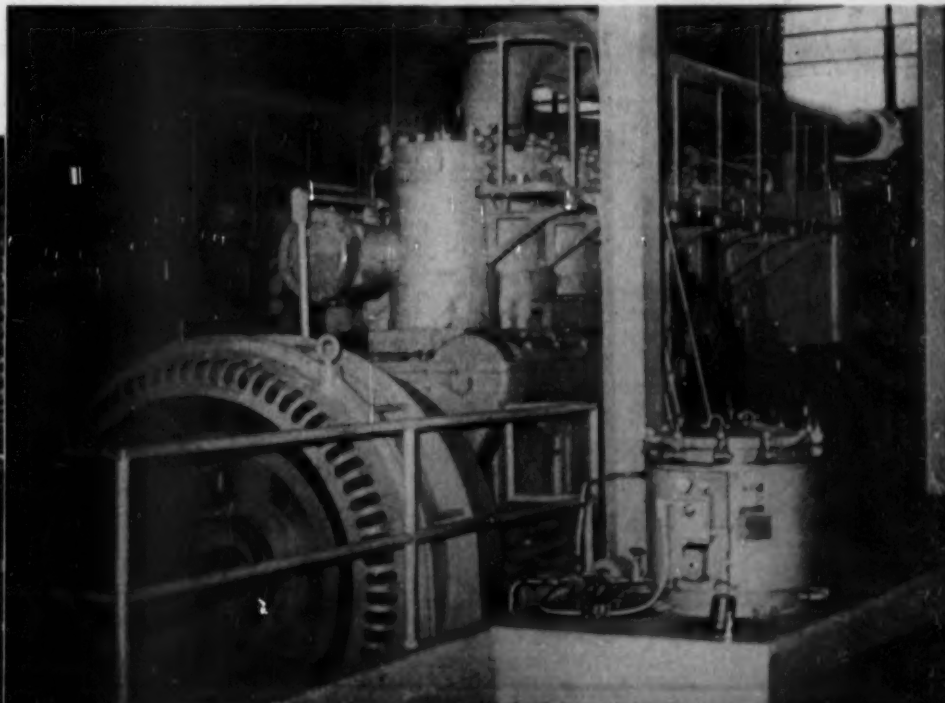
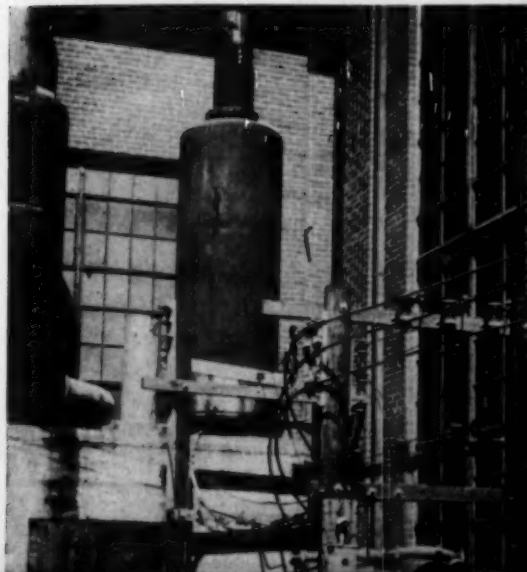
The induced draft cooling tower which was installed for cooling the condenser water of the steam turbine was utilized for the cooling system.

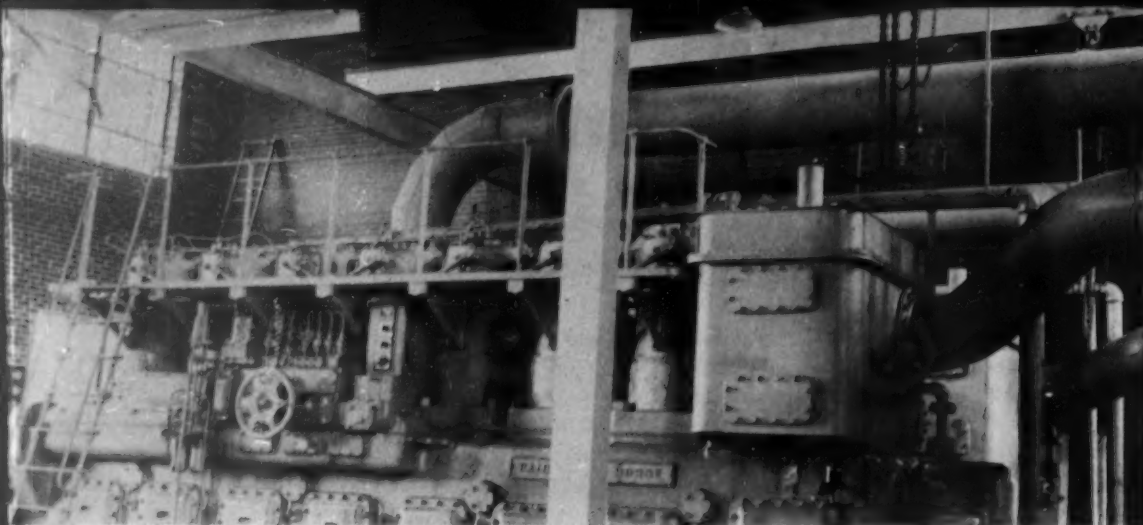
\*Engineer with Russell & Axon,  
Consulting Engineers.

One of the 805 hp. Fairbanks-Morse diesels installed at Mascoutah, Ill. with Hilco lube oil filter in foreground.

55

The two Burgess Manning Snubbers outside the Mascoutah power plant with air intake chamber underneath housing the American viscous type air filters.





Diesel engine units showing air intake and exhaust piping.

TABLE I

Diesel engine generating Unit No. 1:	Full Load	$\frac{3}{4}$ Load	$\frac{1}{2}$ Load
Duration of test .....	30 min.	30 min.	30 min.
Fuel oil used .....	152½ lbs.	119¾ lbs.	88½ lbs.
Power generated .....	269.3 KWH.	205.9 KWH.	142.9 KWH.
Fuel consumption rate .....	0.566 lbs./KWH.	0.582 lbs./KWH.	0.619 lbs./KWH.
Equivalent KWH. per gallon .....	12.7	12.3	11.6
Diesel engine generating Unit No. 2:			
Duration of test .....	30 min.	45 min.	30 min.
Fuel oil used .....	154 lbs.	181¾ lbs.	84½ lbs.
Power generated .....	267.7 KWH.	301.3 KWH.	131.2 KWH.
Fuel consumption rate .....	0.573 lbs./KWH.	0.603 lbs./KWH.	0.658 lbs./KWH.
Equivalent KWH. per gallon .....	12.5	11.9	11.2

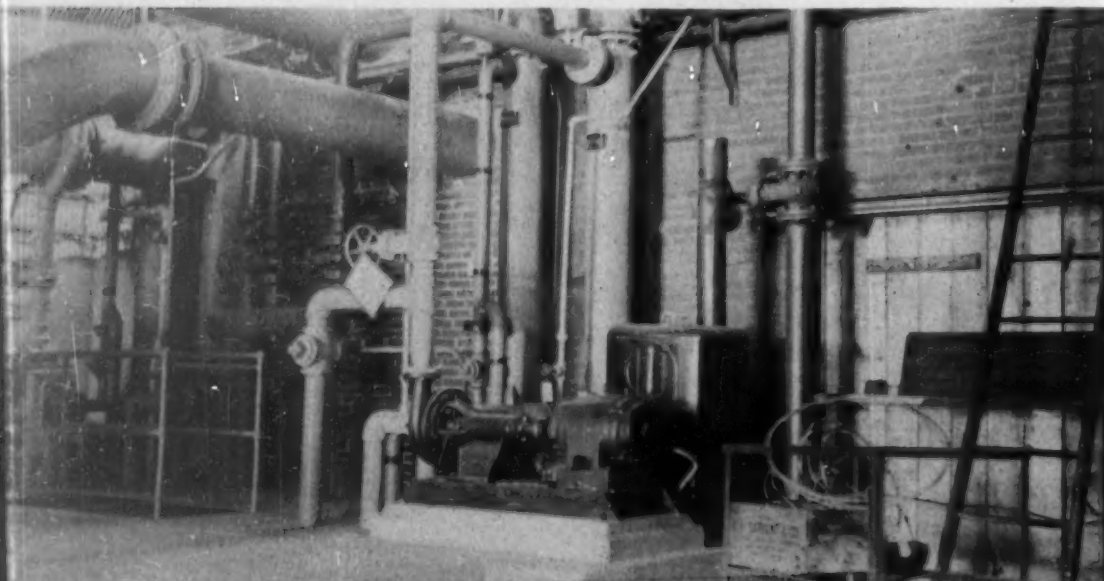
It has adequate cooling capacity for the two diesel units and the steam turbine as well. There are two raw water pumps connected to a header so that either pump can be used with either engine. The pumps are of 400 gpm. capacity, driven by 7½ hp. motors which take suction from the base of the tower and discharge through the lube oil coolers, then through the jacket water heat exchangers and back to the cooling tower. Jacket water is circulated by two pumps of 400 gpm. capacity each driven by 7½ hp. motors discharging through the heat exchangers. Jacket water temperature is regulated by adjusting the gate valves in the circulating lines and utilizing a bypass line around the heat exchanger. Lube oil for each engine is circulated by built-in pumps which pump the oil through the lube oil coolers and twin strainers. Each engine also has a continuous bypass lube oil purifier of the cartridge type with electric heater for more efficient operation.

Reinforced concrete air intake boxes were con-

structed, which act as silencers and also support the filters. There is a partition wall in each box which holds the American air filters. Air is drawn through these filters and to the engines through steel intake pipes. These concrete boxes also serve as supports for the exhaust silencers which are of the Burgess-Manning vertical snubber type, which are set on the boxes. Starting air is provided by a two stage air cooled compressor driven by either an electric motor or a gasoline engine. Each engine has a gauge board having pressure gauges for scavenging air, fuel oil, lube oil, raw water and jacket water. The pyrometer is also mounted on this gauge board. There are visible and audible alarms for pressure and temperature. In order to keep down costs the present switchboard was rehabilitated. The two generator panels formerly used for the steam engines were revamped by adding meters, switches and controls of proper size and capacity.

The first unit was put in operation in July 1951. It was operated in parallel with the turbine and

Diesel engine auxiliaries and piping.



used principally during peak periods, as a means of testing, adjusting and "breaking in" the unit. The second unit was put in operation early in August. It so happened, that the steam turbine unit which had been operating without a shutdown for over a year developed trouble with steam header leaks at this time. The diesels were ready to take over the load and the steam plant shut down for much needed repairs and adjustments. Fuel oil economy tests were conducted on the units on August 28, 1951. The line load of the system was used and the amount of load desired on the unit being tested was obtained by the governor setting. In each case the unit not being tested carried the load fluctuations. The fuel oil was weighed on a platform scales and the amount of power being generated was determined by counting the revolutions of meter disc of watt-hour meter on generator panel. The fuel oil used had a flash point, minimum of 190 deg., an API gravity of 32.5, and a Cetane number of 43. From this information the calculated weight of the fuel oil was 7.184 lbs. per gallon. A summary of the results of the fuel economy test runs is shown in Table I.

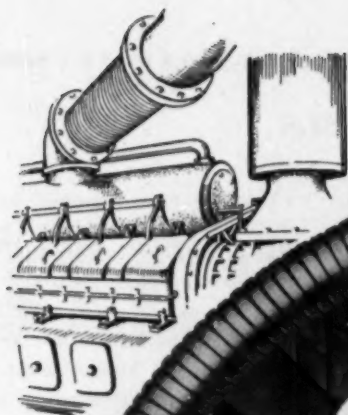
The tests were satisfactory and showed that the fuel consumption rates were equal to or better than the guarantees given by the contractors. The diesel units have not operated for a sufficiently long period of time to obtain any detailed operating results, but it is already apparent that the fuel costs are less than those of the steam plant. The fuel oil now costs approximately 9¾ cents per gallon, which gives an average fuel oil cost of about 8.1 mills. Adding lube oil costs of 0.4 mills, which is the average at present, the total fuel and lube oil cost with the diesels will average about 8.5 mills per kwh.

Future operating schedules will, of necessity, depend on conditions and load increases, but the most economical plan appears to be based on using the diesel units to the fullest advantage to reduce operating costs. The two units, operating in parallel, will take care of the probable peaks for about 2 years. Then it will be necessary to use the steam plant only periodically when the diesels are shut down for maintenance work, etc. Consideration is being given to the installation of a third and larger diesel unit when financing can be arranged.

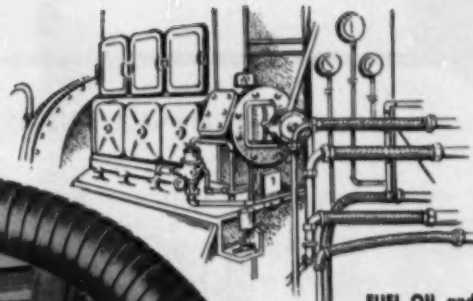
#### List of Equipment

Engines—2 Model 33E14 Fairbanks-Morse, 805 bhp. each.  
 Generator—556 kw. at 80% P.F., Fairbanks-Morse.  
 Governor—Woodward.  
 Switchboard & Switchgear—Westinghouse.  
 Lube Oil—Standard Oil, S.A.E. 50  
 Lube Oil Strainer—Purolator.  
 Lube Oil Filter—Hilco Hyflow.  
 Lube Oil Cooler—Ross.  
 Fuel Oil Transfer Pump—Roper  
 Fuel Oil Filter—Hilco Hyflow.  
 Heat Exchanger—Ross.  
 Cooling Tower—Marley Induced Draft.  
 Intake Air Filters—American.  
 Exhaust Silencer—Burgess-Manning.  
 Exhaust Pyrometer—Alnor.  
 Gauges & Thermometers—Diesel Plant Specialties.





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and AIR  
INTAKES



FUEL OIL and  
STARTING AIR  
LINES



LUBRICATING OIL  
and CIRCULATING  
WATER LINES



## CUSHIONS PULSE OF POWER ...TO MAKE A DIESEL PUR-R-R

### PENFLEX FLEXIBLE TUBING DAMPS VIBRATION OUT OF TUG "TITAN'S" DIESEL EXHAUST

As she "revs up" for action, the Nordberg Diesel in the powerful "Titan" just purrs like a kitten. One of the secrets of this big ocean-going tug's smooth, vibration-free power is "flexineering"—the scientific engineering of flexible metallic tubing to the specific requirements of the job.

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flexes to soak up all vibration. Extra outer jacket provides efficient air cooling. Tubing is safe, tight as pipe—but flexible.

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# Supervising & Operating Engineers Section

CONDUCTED BY R. L. GREGORY

## A DISCUSSION OF DIESEL FUELS

**F**OR over a year, your writer has been accumulating data and experiences of a proven worth from several sources on the subject of diesel fuels. Around the year 1940, the representative of a large diesel manufacturer made the remark to your writer that "At last, in the present diesel units, we have found the Utopia and answer to cheap power, and I personally feel that we have about reached the point in diesel design, where further improvements on the units, will not show any improvement in over-all efficiency." The past decade has shown how erroneous he was in that statement.

As we have delved into this subject of diesel fuels the responses to our queries and the results of many experiences have proven to us, that the reactions we have received on the subject become more complicated as each month passes. And after summing the matter up in its entirety we have concluded that this situation is the natural result of many factors, and not one to be wondered at. Let's look into this problem of fuels from many angles.

We do know that the successful operation of any diesel unit depends upon several varying conditions, the four principal ones being: 1. Proper mechanical condition of the unit. 2. Proper combustion. 3. Proper cooling and the dissipation of heat. 4. Proper lubrication. Of course there are others, but these four points seem to be the main items involved. Manufacturers of diesel units are constantly striving to improve the design, mechanically, of their units, thus effecting the functions of the last three items above. While so doing, they do have to incorporate the effect that fuels will have on these design changes.

On the other hand the fuel vendor attempts to keep pace with the manufacturer and he too tries to improve his product in so far as the limitation of costs will permit him to. He is faced with a competitive market and he tries to produce a cheaper fuel that will give more efficient results. About the time that the manufacturer has made an improvement on his unit, he is faced with a different kind of fuel and the round robin continues between the manufacturer and the fuel vendor. We all know from experience that the quality of the fuel plays a vital point in securing good combustion. We also know that engine design plays a vital part in good combustion, whether it be in the fuel injection system or other mechanical parts of the unit. Of course, we are assuming that any unit which we may be discussing is as mechanically perfect as it is or has been humanly possible to keep it. We also know that good combustion is the result of quick burning of the fuel, and complete burning, at the beginning of the power stroke,

followed by the proper length of expansion. Such a condition results in three important conditions, a lower exhaust pressure, a lower exhaust temperature and a practically clear exhaust.

With such conditions prevailing and assuming that the cooling and lubricating systems are in good condition, the problems of proper cooling and proper lubrication become of less importance, where a good cooling agent and the proper grade of lubricant is used. Now most diesel units will operate on several fuels varying in character, but in many cases the degree of efficiency procured from a unit will also vary in accordance with the type of fuel used. This again depends a great deal on just how the unit is designed. Some units will perform more satisfactorily on premium fuels, while others will do just as well on the heavier types of fuel. We have found in our survey that it is the opinion of many superintendents and operators, that it costs money to burn the lower and consequently cheaper grades of fuel oil, that is, the heavier fuels such as the various grades which come under the cognomen of "Bunker C" oils. They contend that in the burning of these heavier fuels, their maintenance costs increase and the savings in the cost of this type of fuel over that of the cost of the premium fuels is eventually eaten up by increased maintenance costs.

Other superintendents and operators alike, claim that they are successfully burning these heavier types of fuels without too much increase in maintenance costs, and the over-all picture shows a definite savings over the burning of premium fuel. From experiences your writer has had with the two types of fuels, he will have to agree with the argument put up by the first group, provided that group does not take the necessary steps that must go along with the burning of these heavier fuels, in order to keep these maintenance costs down. If they have been burning the premium fuels and change over to the heavier fuels, without making the proper changes in their units to accommodate these heavy fuels and burn them efficiently, they will naturally run into increased maintenance costs.

These heavier fuels contain many more impurities than the more expensive or premium fuels and these impurities do lend to increased wear of the fuel injection parts, ring wear and liner wear become excessive as compared with the wear of these various parts where the premium fuels are used. The first thing that must be done with these heavy fuels is to thoroughly process them by centrifuging and cleaning them, preheating them to the proper temperature and in many instances adopting the use of a good fuel oil additive.

I know that many supervisors and operators as well as fuel vendors are more or less skeptical about fuel oil additives and well they may be if for some reason or other they have had the sad experience of trying out a fuel oil additive which has been placed on the market just as a product to sell. There are, like lube oil additives, many varieties of these fuel oil additives, some of which are not worth a plugged nickel, but on the other hand there are some reputable products, which if used religiously and properly applied will give most convincing results. These additives however should be compounded exclusively to treat the type of fuel being used and the good ones do not claim to be a cure-all for any type of fuel in question.

Once the fuel has been properly cleaned, the next step to be taken into consideration is to see that it is delivered to the unit at the right temperature for best combustion results. This we have found involves further study of the fuel injection system. Proper nozzles and injection equipment must be used with this type of fuel, and to arrive at the proper equipment for injection and burning usually takes the combined and coordinated efforts of both the manufacturer and those in charge of the units. As mentioned before, there are so many varieties of these "Bunker C" oils, from different fields that you are bound to run into variables which present problems that will take the combined efforts of the manufacturer and plant personnel to solve.

In the past not too much has been done with the use of straight crude oil being burned as diesel fuel. However, there is at the present time, considerable interest being shown in this type of fuel, since it is one of the cheapest fuels available, and we hope to present in one of the follow-up articles, a discussion and give results as obtained by some of the plants using straight crudes for fuel. Straight run fuel oil is in quite common use. This is topped oil coming from the still, and from which the petroleum products, such as naphtha, benzine, gasoline, kerosene and the light grades of distillate have been removed. This oil is sometimes blended with lighter fuels to procure a more suitable fuel for combustion and where this process is attempted the results have been of a varying nature also. More along this line will be discussed in a later article.

However, we might state that some difficulties have been encountered in trying to blend these fuels since there is a tendency to separation, where the fuel is allowed to remain in storage for any great length of time.

... and now please turn to page 60 ...



# PETTER

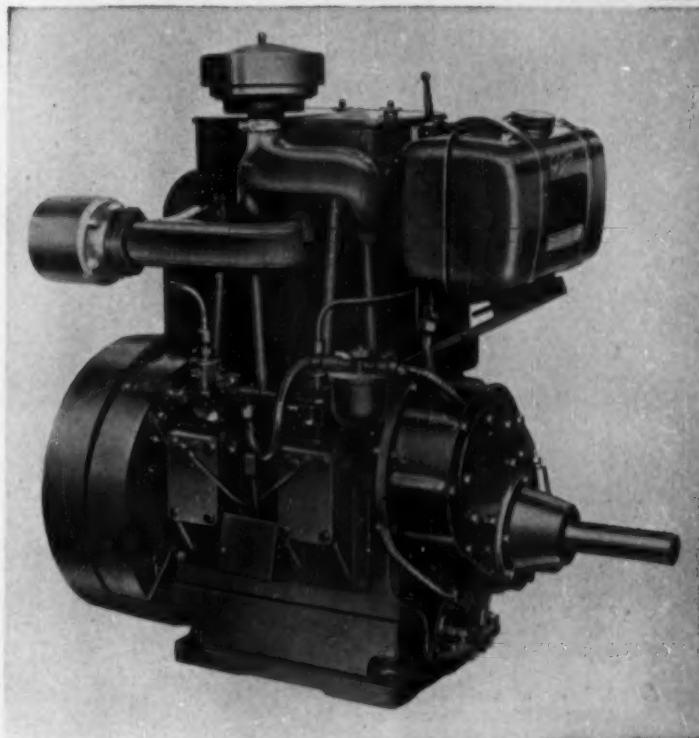


## DIESEL ENGINES

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### Supervising ... continued from page 58 ...

There are so many factors to take into consideration in this matter of fuel oil, and we have attempted to get accurate information from both large and small diesel plants, manufacturers and fuel oil refiners and vendors, so that we can present an over-all picture of the fuel problem to our readers. We recognize that it is an important point in our attempt to fight the ever increasing cost of plant operation, and that since fuel costs are one of the major costs in plant operation, we do feel that any information which we may have accumulated and can pass on to our readers for their enlightenment, may well be worth the trouble of making such a survey.

We also recognize the fact that the larger diesel plants throughout the country, using an enormous amount of fuel each year, are in a much better position to try out these heavier and cheaper fuels than are the smaller plants, inasmuch as the cost of processing and heating these heavier fuels for proper combustion can be divided among the several units, thus lowering the kwh. cost per gallon. Geographical position also plays an important part in fuel costs as is well known among diesel operators, since fuel can be purchased much more cheaply where delivered by water than by tank cars or tankers. Your writer can remember an instance of several years ago, where good Bunker C oil was bought by a diesel plant in a coastal town, where it could be delivered directly by boat to the

storage tanks of a plant for less than one cent a gallon, while inland plants paying freight on tank car deliveries were paying as high as four cents a gallon for the same fuel. Of course that was back in the days of the nineteen thirties.

In our next article we will present a discussion on these fuels by an executive of one of the large mid-west refineries, and this discussion will cover several phases, from his experience and viewpoint on the matter of diesel fuels.

### DEMA Officers



A. W. McKinney



William E. Butts

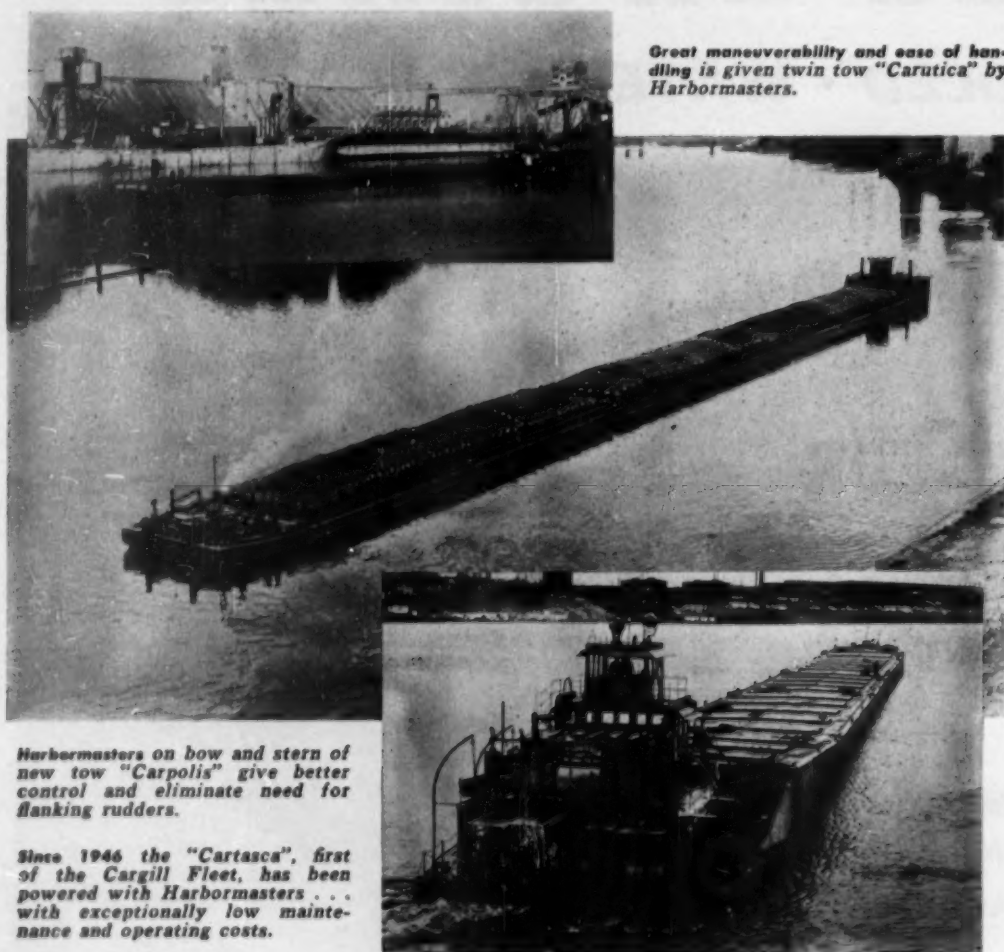


Walter A. Rentschler

A. W. McKinney, executive vice president of the National Supply Company has been elected president of the Diesel Engine Manufacturers Association for 1953 at the annual meeting of the association which took place recently at the Waldorf-Astoria Hotel in New York City. A specialist in petroleum problems, Mr. McKinney held advisory positions in that field during World War II.

Other officers elected to head DEMA during 1953 are: vice president, Walter A. Rentschler, vice president of Baldwin-Lima-Hamilton Corporation of Philadelphia; vice president, William E. Butts, president of Enterprise Engine & Machinery Company of San Francisco; treasurer, Robert H. Morse, Jr., president of Fairbanks, Morse & Co. of Chicago, and as secretary and executive director, Harvey T. Hill of Chicago.

The following men, together with the foregoing officers, will serve as directors of the association: William S. Morris, vice president of American Locomotive Company of New York; C. Paul Clark, president of Clark Bros. Co. of Olean; Gordon Lefebvre, president of The Cooper-Bessemer Corporation of Mt. Vernon, Ohio; George W. Codrington, vice president and general manager of the Cleveland Diesel Engine Division of General Motors Corporation of Detroit; Harald T. Reishus, general manager of the Industrial Power Division of International Harvester Company of Chicago; M. C. Davison, vice president of Ingersoll-Rand Company of New York; Robert E. Friend, president of Nordberg Manufacturing Company of Milwaukee; Otto H. Fischer, president of The Union Diesel Engine Company of Oakland, and E. J. Schwanhauser, executive vice president of Worthington Corporation at Harrison, N. J.



Great maneuverability and ease of handling is given twin tow "Carutica" by Harbormasters.

Harbormasters on bow and stern of new tow "Carpolis" give better control and eliminate need for flanking rudders.

Since 1946 the "Cartasca", first of the Cargill Fleet, has been powered with Harbormasters ... with exceptionally low maintenance and operating costs.

## OUTBOARD PROPULSION gives better control on new 598 foot tow "Carpolis"

A 300 H.P. Harbormaster Outboard Propulsion and Steering Unit installed on the "Carpolis" midway between the two main propulsion units gives the tow positive steering without flanking rudders ... as well as an added 300 H.P. for propulsion. A 130 H.P. Harbormaster is mounted on the nose section. Controls running to the pilot house give the pilot perfect control of bow.

Harbormasters give the Cargill Fleet a high degree of maneuverability and efficiency. Harbormaster Propeller Thrust Steering gives ease of handling on the river and through the locks. The "Carutica" (upper left), one of twin tows,

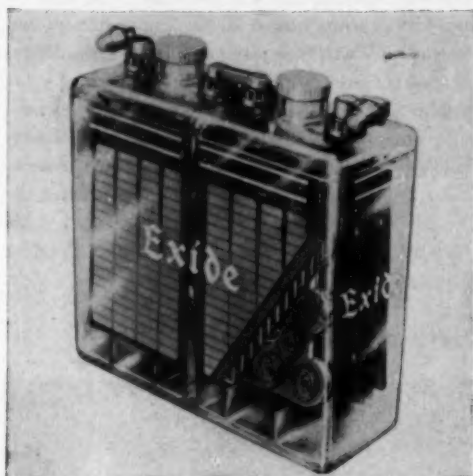
is shown coming into the grain elevators at Albany. Another of the Cargill Fleet, the "Cartasca" (lower right) has been completely powered and controlled with Harbormasters since 1946. She also has a Harbormaster on the bow with controls running to the pilot house. Maintenance costs have been exceptionally low.

Greater maneuverability, efficiency and low operating costs can be gained by installation of Harbormasters on barges, scows, derricks, lighters, etc. Send today for big Harbormaster catalog ... over 70 photos and diagrams ... and see how outboard propulsion can help you.

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## New Series of Batteries



Typical two-cell end-to-end assembly of The Electric Storage Battery Company's new Exide-Manchex Type CME storage battery in transparent polystyrene container. Section has been cut away to show internal construction of the cell and the exclusive Plante type Manchester positive plate.

Greater economies resulting from lower initial cost, increased efficiency and long, trouble-free life are among the outstanding advantages claimed for the new series of Exide-Manchex batteries in transparent plastic containers announced by The Electric Storage Battery Company. Known as Type CME, they are available in both two-cell and three-cell units to meet rigorous service demands in stationary small power applications. In designing the CME line, Exide engineers have succeeded not only in reducing weight per ampere-hour output but also in decreasing over-all size of the units, thus making possible appreciable savings in installation space.

Other user benefits attributed to the new batteries are unsurpassed dependability for the most vital applications, low operating and maintenance costs, greater watt output per unit of space, highly sustained, useful voltage even during heavy discharge, greater damage resistance through the use of plastic containers and covers, improved flexibility of arrangement without the use of wood trays, fewer cleaning problems, and availability as "dry" batteries when required. The transparent containers and covers are molded from clear, heat-resistant polystyrene, a stable plastic material possessing resistance to damage from shock, thermal and mechanical stresses, and any effects from the electrolyte. The permanent seal between containers and covers eliminates leakage of the electrolyte for the life of the battery. And reduced weight makes for lower transportation charges, easier handling, and less maintenance expense. Heart of the power-packed CME is the world famous manchester type Plante positive plate, an exclusive Exide feature.

In this plate the grid is an alloy, which, unlike pure lead, resists the "forming" action of the electric current during charge and discharge, thus retaining its strength, shape and dimensions. The alloy also resists mechanical strains and holds its original shape without growth or buckling. Detailed information on the Type CME Exide-Manchex is available in a two-color 8-page illustrated booklet punched for convenient insertion into standard

8½ x 11 three-ring binders. An accompanying data sheet and chart shows dimensions, weights, capacities and discharge characteristics. Both may be obtained by writing The Electric Storage Battery Company, Box 8109, Philadelphia 1, Pa.

## New Film

"The Diesel Story," a new film giving a graphic account of the development and uses of the diesel engine, is now available for free showings from the Shell Oil Company. The motion picture is on 16-mm sound film and runs 20 minutes. Recounting the history of the early development of the internal combustion engine, the movie provides a thorough explanation of the principle of four-

stroke engines. It demonstrates the compression-ignition principle of the diesel by comparison with the crude, handmade "fire piston" of hundreds of years ago, and shows why the engine can be used for so many widely differing tasks in industry. The picture is simple in treatment and suitable for general audiences as well as for schools and technical organizations.

"The Diesel Story" is the newest in Shell's motion picture library, among the largest in the oil industry. Among films dealing with the oil industry itself is a series of four in full color entitled, "This Is Oil," which tells by means of live action and animation how oil men search for oil, bring it up out of the ground, refine it and transport it.

There is a vast difference between the easy job of

removing warm water, dirt, and pipe scale from warm

diesel fuel (Vis. 35SSU @ 122 F) compared to the

almost impossible job of removing cold water, or

ice crystals, from cold, viscous diesel fuel @ 10 F.

The 4-Stage EXCEL-SO Separator/Filter is designed

to operate under these conditions, more efficiently,

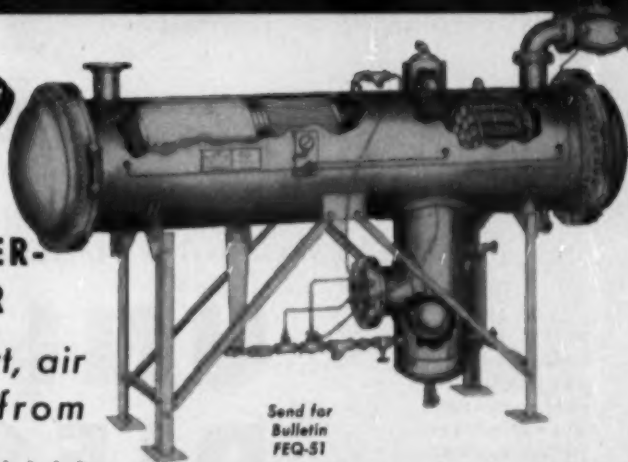
at less operating expense, than conventional single

stage, or two-stage Filters only.

# EXCEL-SO

## 4-stage SEPARATOR-FILTER- AIR ELIMINATOR

removes water, dirt, air  
and pipe scale from  
diesel fuel . . . . .



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## New Spokane Facilities



Now open for business at 3904 East Trent Avenue, Spokane, is the new headquarters of Cummins Diesel Sales, Inc. The building is 80 x 180 feet, with four drive-through truck bays—the doors are 16 feet wide. The truck repair area will accommo-

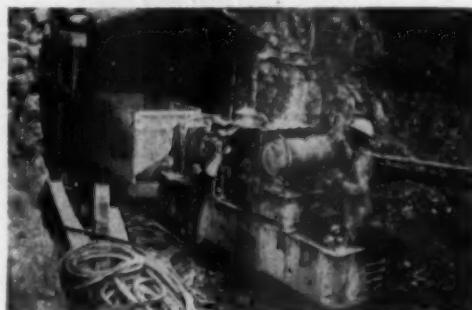
date 12 truck chassis at one time. These facilities will serve Cummins users in the territory west of the Continental Divide in Montana through northern Idaho and to the Columbia River in the State of Washington. John Cannon is president of the dealership and John Peters is manager.

## Boosts Valve Production

New factory facilities for the assembly of control valves were recently acquired at Dallas, Texas, by The Foxboro Company, Foxboro, Mass., manufacturer of the Stabiflo control valve and a complete line of industrial instruments for process measurements and control. Convenient to the office address, 1710 N. Akard St., the new quarters prac-

tically double the area devoted to valve assembly and warehousing, and will facilitate rapid delivery and service to industries throughout the South and Southwest which have been served from the Dallas Branch for over 20 years. Recently expanded valve production facilities at the Foxboro home factory, supplemented by Foxboro branch factory assembly and service at Pittsburgh and San Francisco, serve these areas. Industries in Canada and abroad are served by The Foxboro Company, Limited, Ville LaSalle, P.Q., and Foxboro-Yoxall, Ltd. of London, England.

## Little Work-Horse



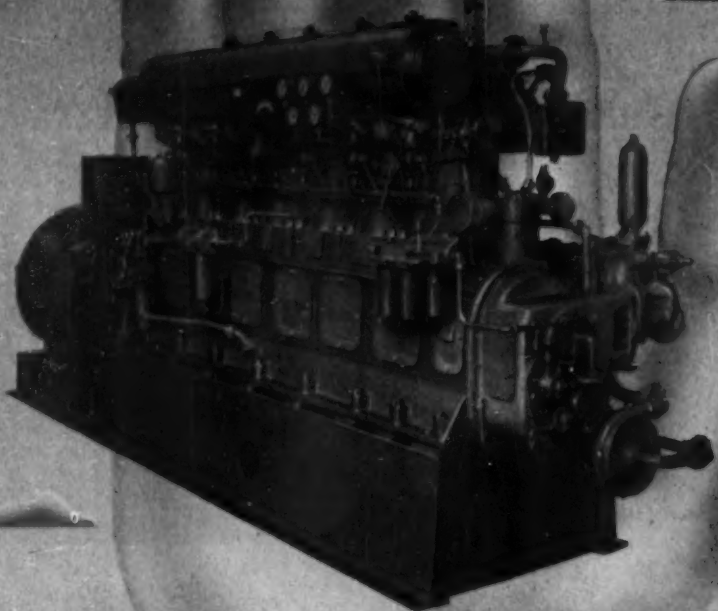
Working on the Poudre Canyon Tunnel is this Whitcomb yard locomotive powered by a three-cylinder General Motors diesel. It moves construction and excavated materials in and out of the tunnel often moving as many as fourteen 3-yard cars per trip. Also working on the tunnel, which is part of the Big Thomson Project in Colorado is a GM generator set and an Ingersoll Rand 600 Gyroflow compressor. This equipment furnishes power for lights, blowers, pumps and power saws and air for cement mixers, jackhammers and a Whirley pump. Both pieces of equipment are powered by GM Series 71 engines.

## Appoints Two Plant Executives

Irving August, formerly superintendent of Worthington Corporation's Denver, Colorado, plant has been appointed assistant to the works manager of that company's Holyoke, Mass. plant, according to an announcement by L. C. Ricketts, vice president in charge of manufacturing. Mr. August has been succeeded by Merrill Berman who has been appointed superintendent of the Denver plant. Mr. August was graduated from Northeastern University with a B.S.M.E. degree in 1937 and then served as a sales and application engineer in Worthington's centrifugal pump division. He then served successively in Worthington's Holyoke, Mass. and Denver, Colo., plants in the vertical turbine pump division. In 1943 he became assistant superintendent and in 1945 superintendent of the Denver plant. He is a member of the American Society of Mechanical Engineers, Rocky Mountain Railroad Club, Colorado Historical Society, and the Denver Y.M.C.A. Rifle and Pistol Club.

Mr. Berman was graduated from Northeastern University in 1943 with a B.S., M.E. degree and joined Worthington's Research and Development Division. In 1945 he became a designer in the Centrifugal Engineering Division and in 1947 a product engineer in the Vertical Turbine Pump Division at Worthington's Harrison, N. J. plant.

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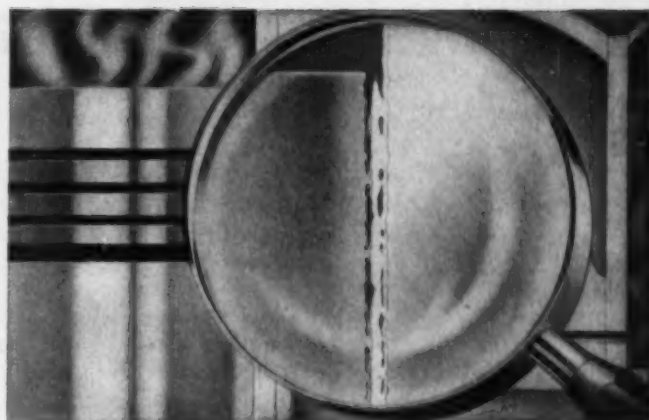
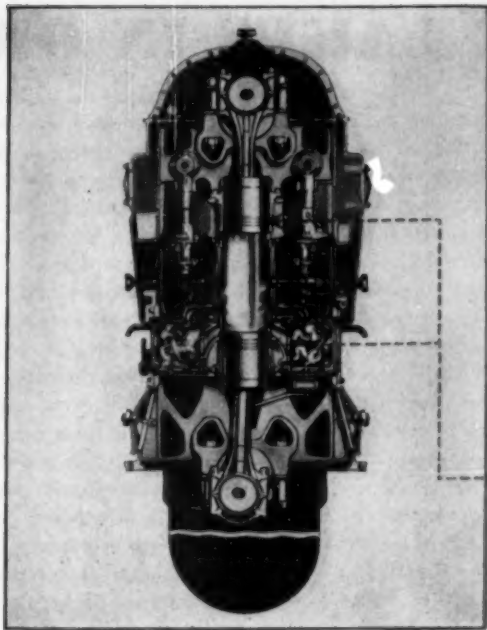
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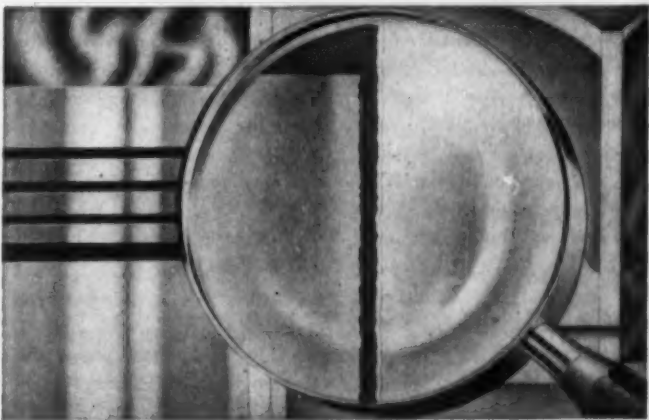




← That demon friction... not only at the points indicated here, but with all moving parts throughout any engine... can steal up to 50% of the power produced by your fuel.

↑ Drawing above illustrates how inferior diesel oils... oils with weak film strength and less free-flowing qualities... provide insufficient lubrication and set up friction points.

↓ Shown below is the complete coverage Cities Service D-C Oils provide. They provide a strong, adequate oil film, a positive seal between piston rings and cylinder walls.



# POWER LOSS DUE TO FRICTION

must be held to a minimum

Much of the power generated by any motor fuel is wasted in overcoming friction. But this loss must, and can be held to a minimum with the proper lubricants... Cities Service Diesel Lubricants.

With exceptionally high film-strength and free-flowing qualities, Cities Service Diesel Oils provide a perfect oil film between all moving parts and thorough lubrication of the most intricate diesel mechanisms under severest operating conditions. They reduce power-stealing friction to the barest minimum.

Be sure you're getting all the power your diesels were designed to give. Use the complete line of Cities Service D-C Oils. Ask your Cities Service Representative, or call the office nearest you.

## CITIES SERVICE DIESEL OILS ALSO:

- Minimize wear under all conditions.
- Provide a positive seal between piston rings and cylinder walls.
- Serve as a coolant to fight heat.
- Clean as they lubricate.

# CITIES SERVICE

# SUPERIOR DIESELS GIVE TROUBLE-FREE SERVICE IN DREDGES OPERATING ON INDIAN AND PORTAGE LAKES IN OHIO

**T**WO Model 40 Superior diesels are providing unfaltering power for the two hydraulic dredges operating on Indian and Portage Lakes. Since installation, diesel operation has not caused a single service interruption and maintenance costs are practically negligible. Indian Lake, Russels Point, Ohio, originally a reservoir for the old Ohio Erie canal system as well as a source for local irrigation, is now a boating, fishing and swimming center for hundreds of summer cottage residents. Unfortunately, silt deposits built up over the years had reached such a depth that it interfered with boating and was easily agitated by shore-line activities. To overcome these difficulties, it was decided to remove the silt to surrounding swampy areas and thereby provide suitable boat channels and, at the same time, open up dock space for an ever increasing number of land owners. In 1948, the Division of Conservation and Natural Resources of Ohio purchased a 10-in. hydraulic dredge from the American Steel Dredge Co., Inc. Power for the dredge is supplied by a Model 40, 8½x10½, 8-cylinder Superior diesel engine, which develops 260 hp. at 575 rpm.

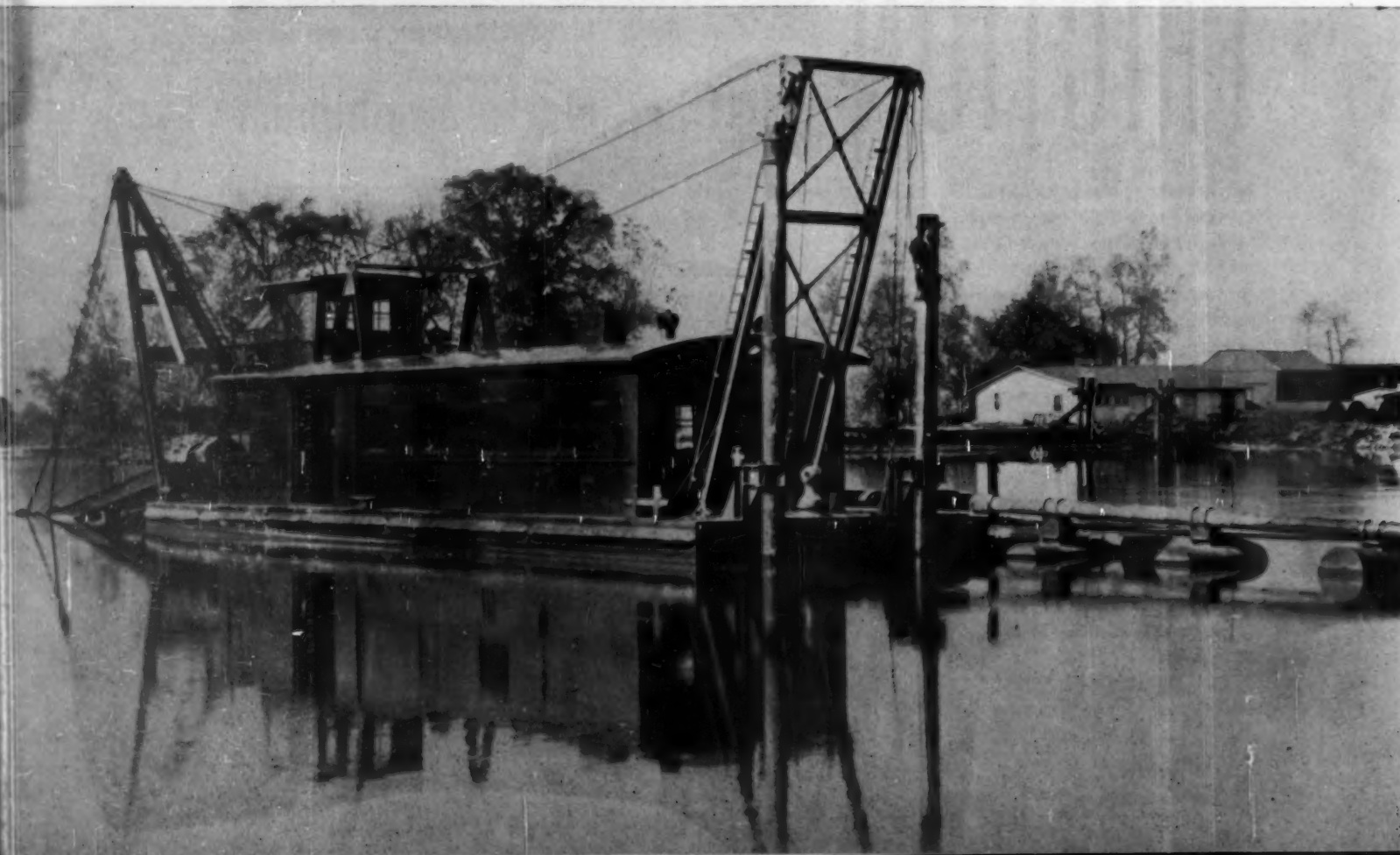
After three and one-half years of service, continuous operation, the dredge with its diesel has accomplished a great deal in clearing channels,

providing room for boat docks and forming small islands. During all phases of operation the Superior diesel gave dependable uninterrupted service, 5 hours a day, 5 days a week for a total of about 4500 hours. Maintenance costs have been practically negligible and lubricating oil was changed only twice a year for seasonal operation. The dredge is capable of moving approximately 110 cubic yards of material an hour through a 10 in. discharge line 1000 feet long. It was designed to dredge at a depth of 15 feet when cutting in a 40 ft. channel, but is capable of reaching a depth of 25 feet. The main suction consists of a Morris type "F," 10 in. heavy-duty dredge pump powered by the Superior. All auxiliaries are driven by electric motors, which are 440 volt, 3 phase, 60 cycle units. A 70 kw. diesel generator set provides the main source of electrical power. Hoisting equipment consists of an American Steel Dredge E-5-M hoist that develops a line pull of 5000 pounds at 40 fpm. Power is provided by a 15 hp. motor. The cutter is driven through shafting and gearing by a 40 hp. motor and two centrifugal pumps furnish all necessary service water. A 7½-kva. diesel generator set serves as a standby for emergency lighting.

The dredge hull is 73 ft. 4 in. long, 18 ft. wide,

5 ft. deep, with a draft of 3 ft. It is of the knocked-down, inside-bolted panel design and was assembled on launching ways at the site. The deck house is also constructed of pre-fabricated panels shipped to the site for assembly. Special waterproof gaskets were used in all joints and the panels form a smooth exterior with all bolts on the inside. Normal dredging at Indian Lake required the pumping of heavy silt and mud and, in many instances, large stones, branches and other debris, which called for an extra surge of power. The engine handled all loads with ease; Mr. Colvin, park manager says, "The Superior has never given a minute's trouble—in fact, the performance of this unit led us to purchase another of the same model to power a new dredge for Portage Lakes." The Portage Lakes dredge, also purchased from the American Steel Dredge Co., Inc., has a 12 in. line and is powered by a Model 40 Superior super-charged diesel that develops 450 hp. at 625 rpm. From experience gained on the Indian Lake dredge, it was found that anchor maneuverability was difficult when using an anchor barge and motor launch. To overcome this, two anchor booms were provided on the forward end of the Portage Lakes dredge, thereby making it completely independent of an auxiliary plant during dredging. It has a rated capacity of 170 cubic yards of ma-

The Indian Lake dredge is of inside-bolted panel design with special waterproof joint gaskets. Its heavy duty pump is driven by a model 40, 8½x10½, 8-cylinder, Superior diesel capable of developing 260 hp. at 575 rpm. Rear port view shows spuds and ladder in dredging position.

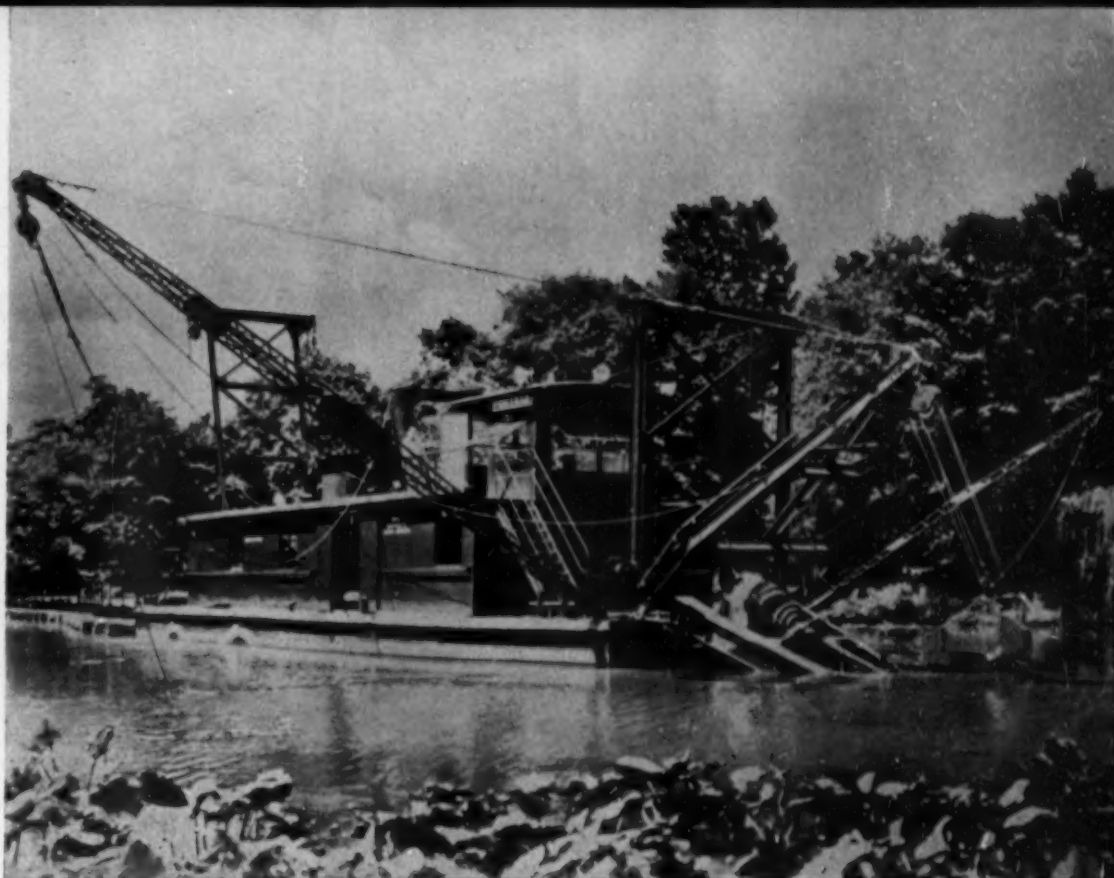




terial an hour and is capable of dredging to a depth of 15 ft. with a discharge line 2000 ft. long.

Both the Indian Lake and Portage Lakes diesels are of the vertical, 4 cycle, cold-starting, mechanical-injection type of enbloc design. The engines were developed for the most severe service, and construction, therefore, is of the most rugged type. The engines are entirely enclosed with dust excluding and oil-retaining covers, which are easily removed to give free accessibility to all working parts. The Portage Lakes dredge hull is 80 feet long, 24 feet wide, 6 feet deep, with a draft of 3 feet. It is constructed of nine water-tight pontoons bolted together at the deck line and fastened under water near the bottom by special water-tight pin connections. This design eliminates the need of launching ways and other dismantling facilities when moving the dredge from one location to another. Deck house is of inside bolted, panel construction similar to that on the Indian Lake dredge. An oil fired automatic boiler furnishes heat to the deck house during idle periods.

The dredge pump powered by the Superior is a Morris type "G," 12 in., heavy-duty unit, which is primed by a Roots-Connorsville motor driven pump. Both the pump and generator engines are air started. The cutter is driven by a 40 hp. motor through shafting and gearing. Two centrifugal  $2\frac{1}{2}$  S x 3 pumps are provided for water service, and a centrally located bilge system removes leakage from the pontoons. Hoisting machinery on the Portage Lakes dredge consists of a 7 drum hoist that develops a line pull of 10,000 pounds at 40 fpm. Power is provided by a 25 hp. motor for 50 per cent speed reduction. Five drums are located in line for operation of the hoist, speed and swing lines; two additional drums are located forward of the others for anchor operation. Hoist proper is operated through pneumatic valves, which provide accurate control through regulated air pressure. This assures setting the clutches and brakes to a fine degree and permits slipping them in positive graduations whenever necessary.

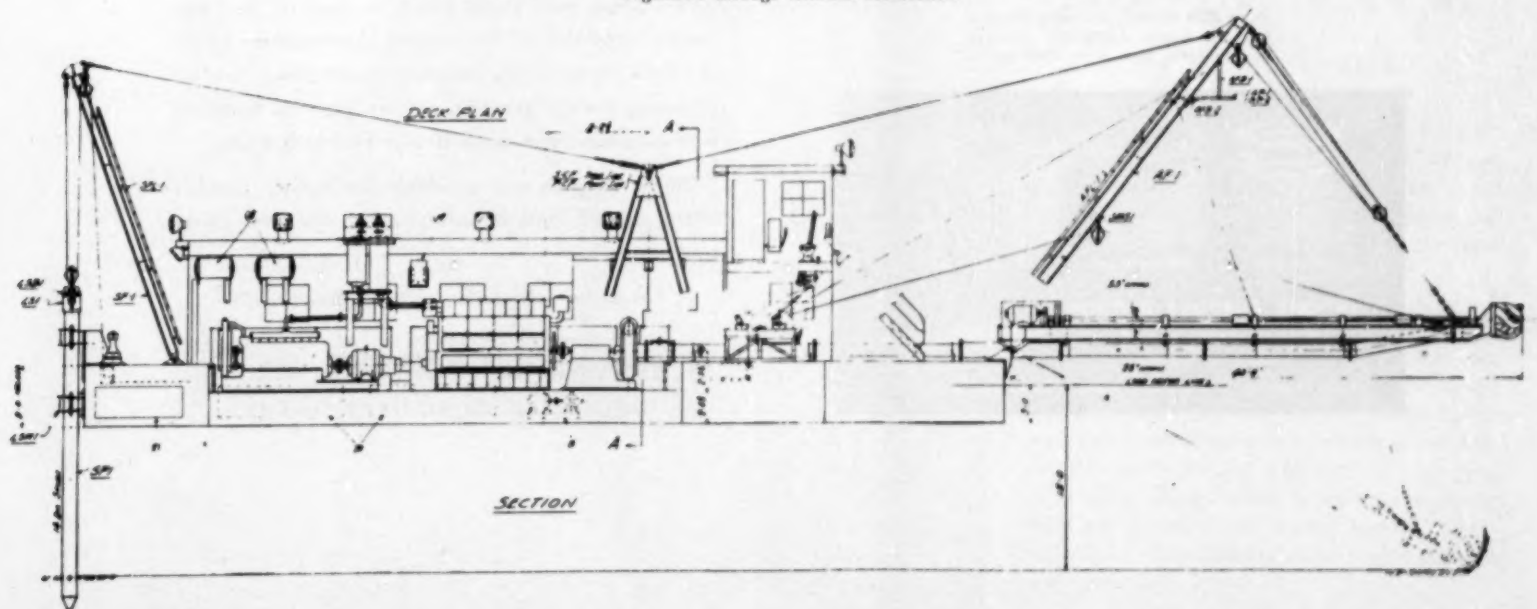


The Portage Lakes dredge hull is constructed of nine water-tight pontoons, making it practically unsinkable. The heavy duty dredge pump is driven by a model 40, 450 hp. Superior supercharged diesel. The swing anchor booms provide easy maneuverability during dredging operations.

The dredge operates with a line approximately 1800 feet long at a head of 40 feet. Since each foot of elevation is equivalent to an additional 50 feet of pipe, the dredge can be said to operate with 3800 feet of line. Operating an average of 7 hours a day, handling 250 to 300 cubic yards of material an hour, the dredge pumps about 1500 to 2000 cubic yards a day. It is estimated that about one-half million cubic yards of silt must be moved to clear the lakes. The engine pump unit operates at an average of 550 hpm. under normal load conditions, with power to spare when needed. Since installation, the engine has not given a single power failure and has cost nothing for main-

tenance. Captain Herbert Lewellin, director of dredge operations at Portage Lakes, has worked with dredges for the past 37 years, dredging all along the Atlantic Coast from Maine to Florida and around the Gulf of Texas, including the Barge Canal and Hudson River. When asked about engine performance, Captain Lewellin gave the following statement: "Our Superior engine assures us dependable, fast starts and gives excellent performance under any load conditions. We have never had a bit of trouble with this power unit, and I can also say that during my entire 37 years of dredging, I have never worked with an engine I like better."

Section view of the Indian Lake dredge shows equipment arrangement. Mechanical control is through levers and rods to motor driven winches below pilot house; motor speeds are regulated through manual controllers.

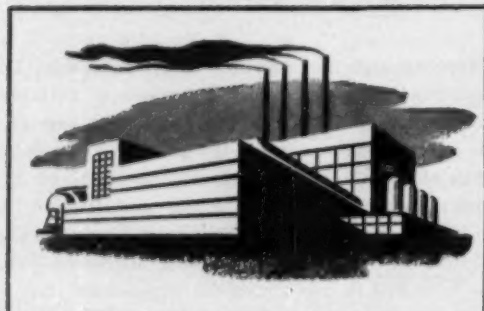


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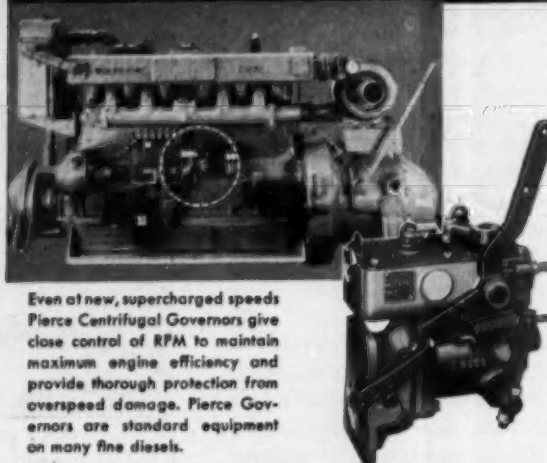


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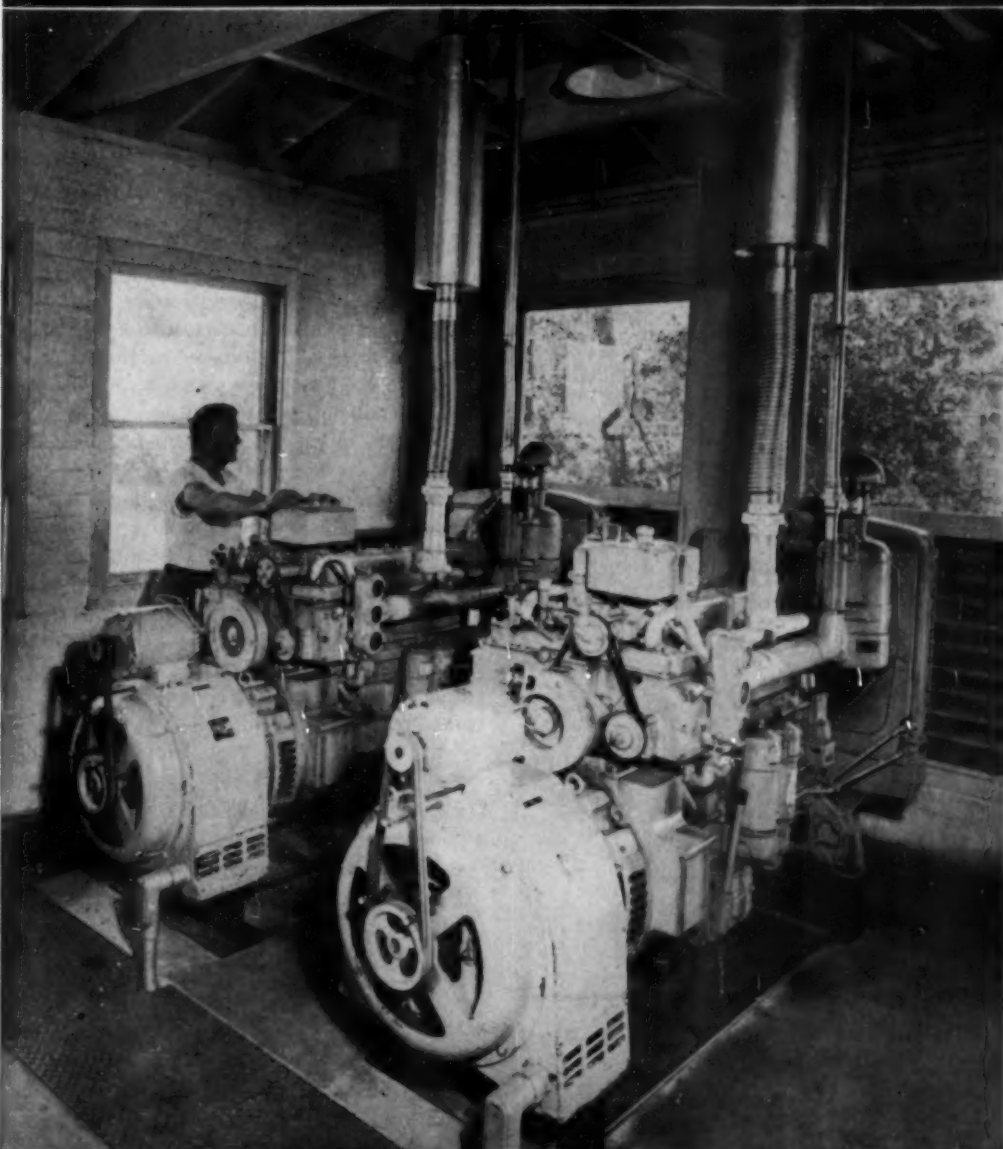
For further information write for Bulletin 407

**SYNCHRO-START PRODUCTS, INC.**  
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Two Caterpillar D4600 diesel electric sets are used for standby power in case of commercial power failure at KHJ-TV and KHJ-FM transmitter station at Mt. Wilson, California.



## TV POWER ASSURANCE

By W. L. BODE

**P**OWER assurance for KLAC-TV and KHJ-TV of Hollywood is supplied at their Mt. Wilson, Calif., transmitter stations by Caterpillar diesel electric sets, protecting these stations against program interruption and loss of revenue in the event of commercial power failure.

KLAC-TV installed a D13000 set with 83 kw. capacity three years ago. In case of power failure the machine automatically picks up the load for the station and also supplies lights and heat for buildings. Two D4600 electric sets are used as stand-by power for KHJ-TV and KHJ-FM and also operate a water pump, which is used for domestic water for several of the stations located on top Mt. Wilson. These diesel electric sets were installed seven years ago.

## Joins Field Sales Staff



George D. Thomas

Internationally known for his work in the field of electric power generation, the services of George D. Thomas will now be available to all Sterling Engine customers. Over the past 30 years, Mr. Thomas has designed and supervised electric power installations in many parts of the world.

Among these projects are the Voice of America Tangiers Station, The Gilboa Dam, British West Indies Air Fields, USS *Belfonte*, Delaware Aqueduct and others.

His past accomplishments reflect a thorough understanding of diesel-electric power generation and application problems plus the ability to economically coordinate prime power, accessory equipment and controls for high efficiency operation. In his new capacity Mr. Thomas will be in a position to work in close cooperation with present and prospective Sterling customers, their consulting engineers and installation contractors. He comes to Sterling from the vice presidency of Sinex Projects, Inc. His headquarters will be Sterling's New York City branch office at 11 West 42nd Street.

In announcing this further expansion of Sterling's services to users of diesel power, Robert Russell,

president, states that recent engineering developments made in their Viking diesels have brought about a startling increase in sales of "packaged" diesel electric generator sets as well as special engineered jobs incorporating their larger engines.

## Saves Time on Jobs



Now commercially available is a new wrench that is said to save 25% to 90% production and maintenance time on certain difficult wrenching jobs. A ratcheting socket wrench that is open ended, permits the introduction from any side of the socket and completely around a pipe or tube and straight down on the fitting. There the socket engages nut or bolt and ratchets it off or on as fast as the arm can swing. Heralded as one of the few really new principles in tool design is the TAC open end ratchet wrench. The versatile and time saving uses of this tool proved so valuable to the Armed Forces during the past four years that they required full production up to a short time ago. Now the manufacturer, the Tubing Appliance Company of Los Angeles, has increased manufacturing facilities to take care of government demands and additional production to offer the wrench to the commercial market for prompt delivery.

The manufacturer claims that user time studies show production and maintenance operations are cut by 25% to 90% on hard-to-reach time consuming jobs. Engaging fittings by literally "surrounding" the standing center obstacle (such as tube, pipe, conduit, cable or long stud) the wrench head ratchets by means of internal pawls. These act upon teeth cut into an extremely strong ring which travels in a circular channel around the wrench head. As little as 7" clearance for the regulation square driven handle will permit normal functioning, and without the danger of bending or "chewing up" the tube or fitting—even soft copper. Thin walled sockets incorporating unusually strong steel alloys, come in a range from 3/8 in. to 4 in. in 1/8 in. increments in 64 sizes, making it possible to do the work of an open end wrench, adjustable wrench, box wrench, socket wrench and ratchet wrench. Additional adaptors provide for even greater versatility, and include: a turnbuckle, hex, square drive, rigid head, Phillips screwdriver, Allen head, Spanner, push rod housing and others now being readied for use.

The open end ratchet wrench is not a "special" tool, but "... a universal tool with more applications and higher efficiency than any other single wrench known," a company spokesman claims. The TAC wrench required five years of work and determination on the part of Herb Fish and Dick Johnson, inventor and partner, before the wrench was finally perfected to their satisfaction.

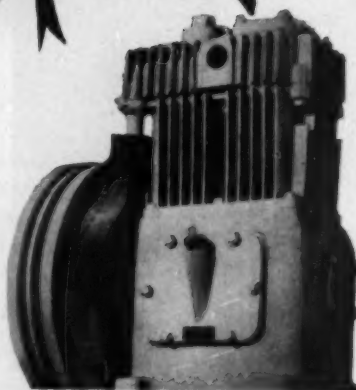
## TAKE THE BULL BY THE HORNS



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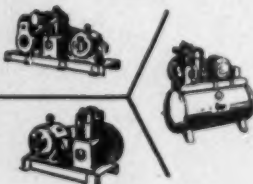


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## Spectrographic Analysis of Lube Oil

"Spectrographic Analysis of Diesel Engine Lubricating Oil," published recently by American Locomotive Company of Schenectady, N. Y., tells in 78 pages of text and photographs how the spectrograph, a scientific instrument that can detect exceedingly small amounts of chemical elements in any substance, is now being used by diesel locomotive engineers to control engine maintenance and prevent costly breakdowns.

The new publication presents a carefully edited transcription, based on on-the-spot tape recordings, of nine technical papers delivered at a symposium sponsored by American Locomotive last Spring, attended by 86 representatives from 43 railroads in all parts of the United States and Canada. These papers, complete with tabular data, case histories, and pictures, show how the spectrographic method has been adapted to diesel locomotive maintenance by leading railroads, together with Alco's own experience in extending this new scientific technique on a broader scale. Detailed accounts of railroad experience with the spectrograph are given by V. E. Amspacher, Chief Chemist of the Pennsylvania; W. E. Lasky, Engineer of Tests, Gulf, Mobile & Ohio; J. A. Levens, Petroleum Chemist, and C. E. Webb, Assistant Engineer of Tests, Baltimore & Ohio; C. G. Mugford, Assistant Engineer of Tests, Southern Pacific; L. S. Crane, Engineer of Tests, Southern; and R. W. Seniff, Engineer of Tests, Baltimore & Ohio. Alco's part in the development of spectrographic analysis is outlined by A. C. Mengel, Chief Chemical Engineer; L. L. Kathan, Chemical Engineer; and H. R. Sennstrom, Research and Testing Engineer.

Briefly, the spectrograph, as used in railroad applications, is a device that makes a photographic record of the various metallic elements found in diesel lubricating oil samples removed periodically from diesel engine crankcases. An analysis of the spectrum photograph results in an indication of the quantity of metallic elements present in the oil sample. Interpretation of the relative quantities of these metallic elements yields an understanding of the specific condition of many engine components, such as pistons, piston rings, cylinder liners, and bearings. Avoidance of serious engine failures, longer life of component parts, and more economical locomotive operation have resulted from the work of numerous railway test department personnel in a new application of this scientific tool.

### Assistant Sales Manager

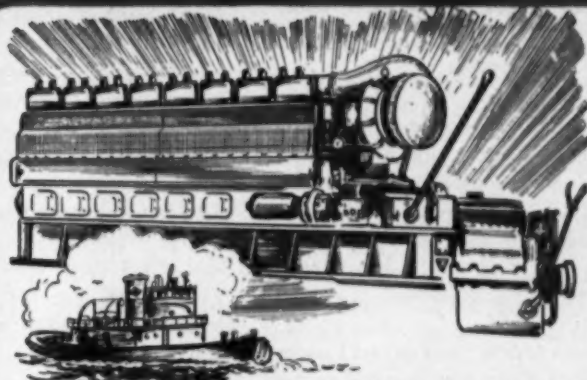


George A. Schiller

George A. Schiller has been named assistant sales manager of the Dollinger Corporation, Rochester, N. Y., manufacturers of industrial filters. He was formerly associated with the Dustex Corporation, Buffalo, N. Y. A native of Rochester, N. Y., Mr. Schiller served as a Navy pilot in World War II. He received a B.S. in mechanical engineering at the University of Buffalo. He is a member of the New York State Engineer's Society.

JANUARY 1953

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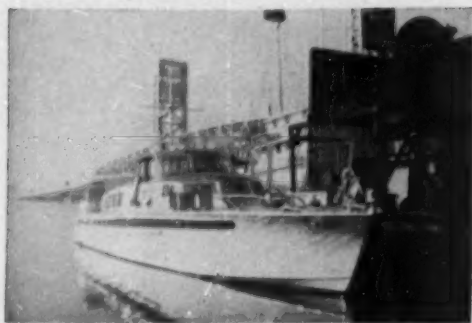


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## \$200,000 Shrimper



The *La Casita*, Col. Smoot's \$200,000 yacht, before conversion into a shrimp trawler and freezer, at the dock of Marine Engineering & Towboat Co., Jacksonville, Florida.

The *La Casita*, a \$200,000 luxury yacht owned by Col. James C. Smoot, General Motors distributor of Panama, S.A., is being converted into a shrimper at the yards of Marine Engineering & Towboat Corp. of Jacksonville, Florida. When the conversion is complete, the 85 foot vessel will be able to freeze and carry 80,000 lbs. of seafood.

Built at the Broward Marine yards in Fort Lauderdale in 1949 the *La Casita* was as exotic as her name, the curvaceous hull contained a plushy

lounge and double staterooms for six passengers and many other sumptuous appointments. But all this lavishness is being stripped from her for her new unglamorous role as a shrimp trawler and freezer. She is being equipped with a special mast and booms. The magnificent staterooms and lounge are being made into 2 refrigeration holds. Mechanically it will be the same vessel, with four GM 6-71 diesel engines, a total of 800 hp., to push it at 16 knots. She also has Twin Disc clutches with 2:1 reduction gears and two GM 2-71 20 kw. Delco generators for refrigeration and auxiliary power.

Col. Smoot's luxury shrimper will be one of the first in South American waters, to employ the quick freeze method. He is keeping the exact location of the shrimp beds a trade secret. It is a sad case of plastic surgery treatment in reverse.

## Orders More Diesel Units

Orders for 64 more diesel units are being placed by the Missouri Pacific Lines at an approximate cost of \$9,812,000. With delivery of these units, the railroad will have 741 diesel locomotive units in operation with all of the system's principal main lines either completely or partially dieselized. Delivery of the new diesels are expected later this year.

## Double Truck Play



It took two White Trucks to handle the job but a 40-ton complete house was moved to a new home-site in Kimpsey, New South Wales, without cracking a window glass and hardly disturbing the window curtains. The house was jacked up on 25 jacks then lowered onto the two White trucks, transported three miles then set in place ready for occupancy all in the same day.

## Southern Representative

V. Avis McCorvey & Company, 212 Mimosa Drive, Decatur, Georgia, is now the Burlington Instrument Company's representative for the entire states of Georgia, Alabama, Mississippi, Florida, Tennessee, North and South Carolina. The Burlington Instrument Company is located in Burlington, Iowa.

## Continuing Report of Operating Efficiency of REA Internal Combustion Plants for September, 1952

Plant No.	Size kw.	Gross Generation M KWH	Sta. Ser. %	Plant Factor %	R P C Factor %	Fuel-Cost		BTU per KWH	HP/Hrs. per Gal. Lube	Man-hrs. Labor Oper.	Maint. \$	Production Costs Mills/Net KWH				BEST OF THE MONTH R P C %	
						Oil \$/gal.	Gas \$/MCF					Labor	Fuel	Other	Total		
4	5000	1,895.1	2.5	52.6	81.1	13.00	23.25	12,015	2870	1501	32	74.54	1.38	2.46	.37	5.07	81.1
19	3939	815.2	1.8	28.7	69.9	10.38		9,392	15,206	369	81	26.32	1.27	7.10	.29	8.66	69.9
26	2120	647.3	.64	41.0	83.3	9.94		12,078	2328	1240			4.51	8.71	.78	14.00	83.3
29	3976	1,025.4	1.4	35.8	64.9	10.27		11,938	1477	1496	244	1180.73	3.95	10.03	1.31	15.29	64.9
42	5400	1,816.0	1.9	46.7	75.7	12.15	26.06	10,838	4803	1754	355	285.37	2.91	4.58	.65	8.14	75.7

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## Bay Area Diesel News

By BRUCE WADMAN

SAN FRANCISCO, December 15—For isolated radio stations on their Shasta route, Southern Pacific has ordered eight Fairbanks-Morse 3-kw. diesel generator sets with fully automatic controls. These Model 45, 1 cylinder, 5¼-hp. units are assembled in pairs, one engine running continuously with the opposite engine for stand-by. Four stations will contain these compact generator sets.

FOR stand-by power in the Providence Hospital in Oakland, a 100-kw. diesel-generator set has recently been installed. The Columbia generator is driven by a Buda 150-hp. engine of the new 8-DC-1290 type. The unit, complete with fully automatic controls, has been engineered and assembled by King-Knight Co.

THE HANA Ranch, located on Maui Island in the Hawaiian chain, has bought a 150-kw. diesel generator set from Kilpatrick Bakeries. Kilpatrick, who, incidentally, isn't trying to enter the diesel engine business, originally bought the unit in 1948 in anticipation of a power shortage but never found it necessary to put the generator set in use. King-Knight has handled the servicing of this unit, consisting of a 225-hp. Superior diesel driving a Burke (Marathon) generator, in preparation for its new role in providing power for a small public utility.

JAY BESORE & Associates have become the Northern California distributor for the Industrial Diesel Engine Div. of P&H diesels. Besore, who has been engineering and assembling generator sets and pumping units for years in the Bay Area, will use P&H diesels for application to these and other industrial uses.

A NEW Cummins Diesel Parts store has recently been opened in Redding by Watson and Meehan. Dick Canny will continue on as sales representative and application engineer in this area.

AMERICAN Motors Co., manufacturers of thermostats for automatic water and oil temperature control on diesel engines, has just finished doubling the size of their factory in Richmond. This plant expansion is an indication of the growing popularity of this efficient and dependable thermostat.

THE STERLING DIV. of the White Motor Co., distributors of Waukesha automotive diesels in the Bay Area, has moved to a new location at Fifth and Brannon Streets in San Francisco. The move was completed on December 8th, and they are now comfortably settled in their new home.

A CHANGE of address for the Buda Engine & Equipment Co. has placed them in a new location at 470 Bayshore Blvd. in San Francisco.

WILLIAM E. BUTTS, president of General Metals Corp., which includes Enterprise Engine & Machinery Co. as a manufacturing division, has recently been elected vice-president of the Diesel Engine Manufacturers Association. This election is further evidence of the growing importance of western industry on our national economy as a whole.

A NEW development in solving the problem of full flow lube oil filtering has been introduced by Winslow Engineering Co. The problem of handling full pump capacity with a unit small enough to be practical has made new element designs and ideas necessary. Winslow's unit has pressure-control full flow action to insure continuous flow through

the element so that the oil is filtered at all times—even under cold operating conditions.

AN INDUSTRIAL power service school is now being conducted by International Harvester for its industrial distributors' service-men. The course, operating in monthly sessions for twenty months, will cover different phases of assemblies in the IH tractors, starting with the TD-24 and extending on down to the TD-6. Each monthly session consists of a breakdown of some specific assembly like the clutch, transmission, etc. Harry Bibler, the service manager of International Harvester's factory branch in Oakland, is heading the unit that is conducting the school.

IN PREPARATION for the rainy season, a pump, driven by a Cummins HRIP-600 175-hp. diesel, is being installed at Folsom Dam for the purpose of pumping water out of the excavating pits.

ANOTHER ORDER has been placed for an additional pumping station in the new Trans-Mountain Oil Pipeline in Western Canada. This station will be located at Blackpool, B.C. and will contain three 1750-hp. Nordberg Supairthermal, crude fuel burning diesels.

REPOWERED recently, the *Lawrence*, a 50 foot drag-fishing boat owned by Tom Lazio of San Francisco, had a heavy duty engine replaced by a GM 6-71 marine diesel supplied by West Coast Engine & Equipment Co.

THE CITY of Oakland officially will open the bidding for the furnishing of four diesel engine driven pumping units for the 34th street storm water pumping station on December 23rd. The specifications call for units to consist of vertical, multi-cylinder diesels of about 1200-hp. each.

Operators of shovels . . . draglines . . . cranes . . . rail cars . . . lift trucks . . . road machinery . . . tractors . . . mining machinery . . . logging equipment . . . oil well rigs are discovering the advantages of **TORCON TORQUE CONVERTERS**. This automatic hydraulic transmission features variable speed and torque ratios, and facilitates the full utilization of your power source throughout the entire range of operation.

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30 to 600. They can be furnished with and without cut-off clutches.

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## Alco Officers



Perry T. Egbert



William S. Morris

The board of directors of American Locomotive Company elected Perry T. Egbert president and William S. Morris executive vice president at a

special meeting last month. Duncan W. Fraser will continue to serve as chairman of the board. Mr. Fraser has devoted his entire business life to the locomotive industry. He became president of American Locomotive in 1940 and chairman in 1945, guiding the company successfully through the war and post-war years. He became both president and chairman in 1950.

Mr. Egbert has served the company in production, sales and engineering capacities since 1920. He was named vice president in 1944 and has been in charge of Locomotive and Ordnance division operations at Auburn and Schenectady, N. Y., where the company builds diesel locomotives and combat tanks. He was appointed manager of railway diesel

sales for the company in 1934, a new division at that time. In this capacity, he was a pioneer in promoting the use of diesel locomotives on the nation's railroads.

Mr. Morris, who joined Alco in 1922, has also been a vice president of the company since 1944. He has been in charge of sales for all divisions. He started his career as a special apprentice at the Schenectady plant, following his graduation from the United States Naval Academy in 1922 and service in the Army in 1917-1918. In 1925 he went to Chicago as sales representative and later became district manager there. In 1940, he was elected vice president of Montreal Locomotive Works, Limited, and became executive vice president of that company in 1944. Later that year, Mr. Morris was transferred to Alco's New York offices as vice president. Since then, he has been in charge of sales for the Alco Products and Stationary Diesel Engine divisions, as well as in charge of diesel locomotives.

# Eatonite-Faced, Sodium-Cooled Valves



**Specified where  
unquestionable dependability  
in heavy duty service  
is a first requirement**

Eaton Sodium-Cooled Valves faced with Eatonite combine two major advantages: (1) reduced operating temperatures through internal cooling, and (2) high resistance to wear, corrosion, and heat through the application of Eatonite to the valve face. An important factor in the outstanding performance records being set by Eatonite-faced valves is the homogeneous structure produced by the exclusive Eaton process used in applying the hard-facing material. The result is long life and dependability in heavy duty service. Eaton Sodium-Cooled, Eatonite-Faced Valves are being used in the Packard Diesels now in production for the U.S. Navy.

## EATON MANUFACTURING COMPANY

General Offices: CLEVELAND, OHIO

VALVE DIVISION: 9771 FRENCH ROAD • DETROIT 13, MICHIGAN



PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valves Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings • Springlites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamic Drives, Brakes, Dynamometers

## Educational Meeting

A group of more than forty diesel industrial executives and professors from engineering departments of eastern universities and colleges attended an educational meeting of the Diesel Engine Manufacturing Association recently at the plant of Purolator Products, Inc., Rahway, N. J. Sponsored by Purolator, a leading manufacturer of automobile, diesel and other types of oil filters, the meeting featured a panel discussion on "Filtration as Applied to Diesel Engines," led by Jules P. Kovacs, Purolator vice-president in charge of engineering. Herbert R. Otto, chief engineer, discussed filtration for internal combustion engines, and Stuart Cooper, director of industrial relations, outlined job opportunities with Purolator for graduating engineers.

Ralph R. Layte, president, and Carlos D. Kelly, vice-president, Purolator Products, Inc., welcomed the group, and a tour of plant facilities took place after luncheon at Colonia Country Club. DEMA educational meetings are designed to bring together academic and professional diesel leaders to discuss problems of research and education, and to interest young engineers in the diesel field.

## Appointed Director of Sales



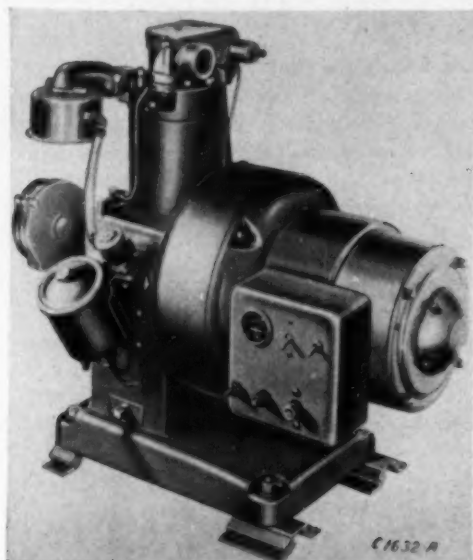
John Hellstrom

John Hellstrom, vice-president of American Air Filter Company, Louisville, Ky., has been appointed director of sales of all AAF and Herman Nelson products. He returned from San Francisco, where he organized and managed the company's Pacific Division, and assumed his new

duties on the first of November. Prior to that time, the sales and advertising department of the Herman Nelson Division, Moline, Ill. were moved to Louisville and all sales including American Air Filter products are under the direct supervision of Mr. Hellstrom. Assisting him is Robert W. Nelson, V.P., formerly of the Herman Nelson Division.



## New Marine Diesel Plants



Two new marine diesel electric generating plants will be introduced by D. W. Onan & Sons Inc. at the 1953 National Motor Boat Show. Both water-cooled, they are the 3,000-watt, single-cylinder Model 3MDSP-232E with 32-volt output for charging storage batteries, and the 5,000-watt, two-cylinder Model 5MDRP-1R which produces 115-volt, 60-cycle alternating current. All other standard voltages are available in both models. The 3,000-watt models are electrically cranked with the generator acting as a powerful cranking motor and are equipped with a decompression device for quick, easy starting. 5-kw. units are equipped with a 12-volt positive gear-engaged starter. All ac. models can be started and stopped from remote stations located within 250 feet of the plants.

These new Onan Marine diesel electric plants are designed for continuous, heavy-duty service. The engines are Onan 4-cycle diesels equipped with rubber impellor marine water pumps, water-cooled mufflers, vibration dampeners, air-intake silencers, low oil pressure cut-off and a high water-temperature safety cut-off. Easy starting at low temperatures is effected by glow plugs. Extension shafts on the front end of the engines permit power take-off.

Model 3MDSP weighs approximately 425 pounds. The two-cylinder 5MDRP models have an approximate weight of 690 pounds. The all-climate Onan generators are direct-connected to the engines for permanent alignment. They are fully insulated for protection against all conditions met in normal marine use.

Other models in the Onan marine line, including belt-driven generators, will be on exhibit. There will be a demonstration display showing the actual workings of Onan standby automatic line transfer controls. A cut-away model of a standard, belt-driven generator, showing points of construction, also will be on display. This generator may be hand-cranked by visitors to produce electric current which will register on a meter. All visitors at the Onan booth are invited to operate both of these interesting displays.

JANUARY 1953



**AEROFIN**

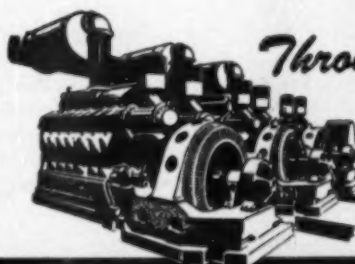
**Heat-  
Transfer  
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You are assured of high efficiency in heating or cooling—long service life—low maintenance and service costs, when you specify Aerofin extended-surface heat exchangers.

The reason is obvious: Aerofin makes heat exchangers *exclusively*—offers you the results of unequalled experience, unequalled production facilities, unequalled materials testing and design research—and the guidance of a complete, highly skilled engineering staff, at the plant and in the field.

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*Aerofin is sold only by manufacturers of nationally  
advertised fan system apparatus. List on request.*

**"she might have been my kid..."**



**T**here was no time to stop, see? She comes running out from behind this parked car right under my wheels. Her hair is in pig-tails, and with the sun shining on it, she might have been my kid. We got her to the hospital. It took 3 pints of blood to bring her around. All I have to do is remember the sound of those screaming tires—and I know

why I'm giving blood."

Yes, all kinds of people give blood—truck drivers, office workers, salesmen. And—for all kinds of reasons. But whatever your reason, this you can be sure of: Whether your blood goes to a local hospital, a combat area or for Civil Defense needs—this priceless, painless gift will some day save an American life!

#### Business Executives!

#### ✓ Check These Questions!

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ☐ Have you given your employees time off to make blood donations?
- ☐ Has your company given any recognition to donors?
- ☐ Do you have a Blood Donor Honor Roll in your company?
- ☐ Have you arranged to have a Bloodmobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed your employees of your company's plan of co-operation?
- ☐ Was this information given through Plant Bulletin or House Magazine?
- ☐ Have you conducted a Donor Pledge Campaign in your company?
- ☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?

Remember, as long as a single pint of blood may mean the difference between life and death for any American . . . the need for blood is urgent!

**Give Blood Now**

**CALL YOUR RED CROSS TODAY!**  
NATIONAL BLOOD PROGRAM





## Inland River Reports

By ED DENNIS

ABUNDANT favorable comment has been made by the rivermen active in the Pittsburgh coal trades relative to the performance of the new *Henry L. Hillman* of the Hillman Transportation Company. This boat is virtually a twin of the earlier *Mary Lea Hillman* save the *Mary Lea* has twin General Motors diesels while the *Henry* is out with twin Superiors. Both are rated as better than 1000 hp.

WE NOTED the *Lady Linda* of the Inland Oil and Transport Company, St. Louis, below Cape Girardeau, Mo., on the Mississippi with six barges instead of four. The two new 205 x 35 x 11 barges were recently completed at the yards of St. Louis Shipbuilding & Steel. The *Lady Linda* now comes up from Texas and lower Mississippi points with 68,000 barrels of petroleum products.

SO FAR as our records show, the largest tow of grain and hay ever to pass through the locks on the Upper Mississippi was pushed in late November by the *Central* of the Central Barge Company, Chicago, Ill. There were 11 barges of grain and a barge of baled hay, totaling 15,500 tons. Some Keokuk river authorities stated they could not remember baled hay by the barge load since the locks and dams were completed. The *Central* has twin Enterprise diesels rated at 3000 hp.

WE ARE inclined to believe the *Laguna* of the Phillips 66 oil folks is about the fastest boat of her size on the Mississippi, especially when moving

loads against the current. Her master, Capt. Charles Fehlig, is said to be of similar opinion. She has been pushing four barges of oil at a time. This 116-ft. boat has twin General Motors engines with about 1800 total horsepower.

THE BRAND-NEW *Stanton K. Smith* of the Smith Oil & Refining Co., Rockford, Ill., is now at work, her twin General Motors diesels (1800 hp.) doing exceptionally fine early work. The boat was built by the Missouri Barge Line Co., Cape Girardeau, Mo.

WE WERE pleased to learn that the *Jerry Waxler* is being thoroughly rebuilt and will soon be seen again towing oil on the rivers. The boat, owned by Capt. S. R. Waxler, was recently almost destroyed by fire. The power will be from two new Caterpillar engines.

A FEATURE CRAFT on the upper Ohio in recent weeks is the new *J. K. Davison* of J. K. Davison & Bro., Pittsburgh, Penna., built by St. Louis Ship. The boat uses twin Caterpillars totaling 800 hp., and the engine room is one of the neatest today on the waterways.

THE *Ruth Brent*, well-known towboat on the lower Mississippi is working this fall and will probably be seen this winter occasionally on the Ohio. She made her first appearance on Nov. 3, and drew a good deal of local newspaper comment. This General Motors diesel powered boat is ten years old and owned by Greenville (Miss.) Towing Co.

WE HAVE from a Mobile reader a picture of the new *James B. Cobb*, towboat-tug of the Findlay Towing Co., Tuscaloosa, Ala., now towing crude from Mobile to Cordova, Ala., on Black Warrior River, powered with a Fairbanks-Morse 300 hp. engine.

THE Glenn M. Crain Towing Co., Pittsburgh, Pa., is completing a new towboat on the steel hull of an LCM, 58 x 15 x 5½ feet. The new boat has not been named but will be powered by a Caterpillar engine of 215 hp., similar to the one used on the *Smoky City*, another pusher owned by Crain.

WE NOTED this month a boat named *Sugar*, said to be a converted war vessel. It is now owned and operated by the West Tennessee Limestone Co., between Clifton, Tenn., and Evansville. This company recently purchased the boats of the old Barrett Line and has Capt. Charles Woods, long with Burrett, as its marine superintendent. We learned this new towboat *Sugar* has twin Caterpillar engines.

ANNOUNCEMENT was made recently that the Northwestern Refining Co., St. Paul, Minn., has leased the towboat *Frank B. Durant* to tow a semi-finish oil product to a river terminal storage plant at St. Paul. Eventually this "oil gas" will be used in the company's new catalytic cracking plant. The *Durant* is a very dependable boat, built in 1950 at the Alexander Shipyards near New Orleans. Twin General Motors engines are doing fine work this year.



### crude oil... purified by Honan-Crane

## CUTS DIESEL FUEL COST 13.4%

#### Municipal Power Plant\* Saves \$8,618 in One Year, Gets More Power, Cleaner Engines

Another diesel power plant, employing Honan-Crane purification, proves the efficiency of crude oil as a diesel fuel. The higher b.t.u. content and lower cost of crude oil are advantages that can be utilized in many diesel operations when Honan-Crane purification is employed. Honan-Crane purifiers remove all types of contamination... engines run cleaner, injection systems, pistons and liners stay cleaner. Savings in fuel cost are matched by reduced maintenance expense.

*Write today for complete information about Honan-Crane Diesel Fuel and Lube Oil Purifiers*

\* Glenwood, Minnesota, Municipal Power Plant, Mr. A. R. Kephart, Superintendent





**Honan-Crane Corporation**  
292 Indianapolis Ave., Lebanon, Indiana  
A Subsidiary of **Houdaille-Hershey Corp.**

ALL HONAN-CRANE EQUIPMENT IS SOLD ON A PERFORMANCE GUARANTEED BASIS



### Acquires Frank C. Hough Co.

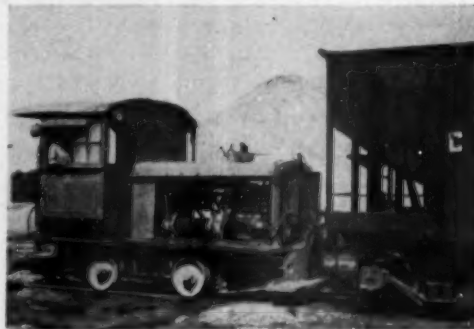
John L. McCaffrey, president of International Harvester Company, has just announced that Harvester has acquired the stock of The Frank C. Hough Co. of Libertyville, Ill., manufacturers of earth-moving, excavating, and material handling equipment. Effective November 1, McCaffrey said, the Hough Company became a wholly owned subsidiary of International Harvester. "The Hough Company's products, including its widely known Payloaders," McCaffrey said, "will effectively supplement our current line of industrial power and earth-moving equipment. We will operate the Hough Company as a wholly owned subsidiary, with no immediate change in the organization of

the company. We feel we are particularly fortunate in having Mr. Frank G. Hough continue as president of the subsidiary company, directing the activities of the business which he has built up."

The Hough Company now has approximately 675 employees. Its facilities at Libertyville include a modern factory with 300,000 square feet of floor space, located on a 110-acre site. The company was established in 1920. Many of its products, Harvester officials said, have been marketed by International Harvester industrial power distributors for many years in the United States. Harvester's foreign operations organization has handled the overseas distribution of Hough products and is at present the largest single customer of the Hough Company.

Hough products include machines for digging, carrying, dumping and unloading earth or other materials, as well as tractor-type prime movers, and bulldozer shovels for use with crawler-type tractors.

### Concentrated Power



In the Judson Steel Corporation's scrap yards at Emeryville, California, a newly repowered Plymouth locomotive is demonstrating its ability to haul twice its former load at only 27% of its former fuel cost. This is in spite of the fact that the new engine (a 3-cylinder General Motors diesel) is rated at only 72 bhp. against 175 bhp. of the gasoline engine it replaced. The secret of the improved performance of the locomotive lies in the application of a torque converter together with the natural economy of the diesel engine. The GM diesel-torque converter unit produces 970 foot-pounds of starting torque as compared to about 400 for the other engine which was obtainable only with excessive slipping of the clutch.

It was soon discovered that twice as many steel gondolas as before could be easily handled in spite of the smaller size of the diesel power plant. Shifting gears has been eliminated and the operator now adjusts speed by a finger-tip hand throttle. Pictured is a similar installation in the service of the Concrete Materials Company of West Des Moines, Iowa. This locomotive was repowered by a four-cylinder GM diesel-torque converter unit and since its installation has also consistently moved bigger loads with a 50% decrease in fuel costs. The California installation was made by the West Coast Engine and Equipment Company of Berkeley, while the Iowa installation was made by Stephens-Jones Company of Des Moines. Both are distributors of the Detroit Diesel Engine Division.

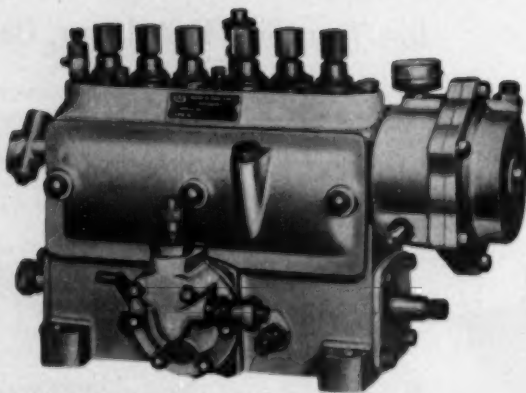
### Elects Two Vice-Presidents

The board of directors of The Griscom-Russell Co., manufacturers of heat transfer apparatus, has elected Oscar W. Heimberger and Robert M. Wallace as vice-presidents. Mr. Heimberger, who is now vice-president of engineering, has been in the company's engineering department since 1923 when he was graduated from Ohio State University. Before his recent election as an officer of the company, he was successively assistant chief engineer and chief engineer. Mr. Wallace, who is now vice-president of manufacturing, has been with Griscom-Russell since 1928, following his graduation from Brown University. He has advanced through the ranks at the Company's plant in Massillon, Ohio, from engineer, welding specialist, assistant superintendent, assistant works manager and works manager.



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FUEL INJECTION EQUIPMENT FOR DIESEL ENGINES**

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in over  
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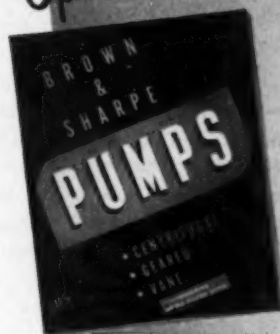


**Fuel Injection and Electrical Equipment**

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Sales Office: 14820 DETROIT AVENUE, CLEVELAND 7, OHIO



*For Trouble-free Diesel  
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*We urge buying through the Distributor*

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Send for a copy of this Catalog and see how many quality-built Brown & Sharpe Pumps are available for diesel use. A wide range of types and sizes in standard rotary geared pumps with various styles of special mountings greatly simplifies the right selection for the job. Have a catalog handy for quick reference. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.



**GOVERNORS  
by PICKERING**

For 90 years the name Pickering has been associated with fine governors. The full line covers all requirements of diesel, dual fuel, steam and gas engine as well as turbine speed regulation.

**ALL MODELS AVAILABLE IN EITHER  
CONSTANT SPEED OR VARIABLE  
SPEED TYPES.**

To secure complete research and design engineering co-operation on governor problems, write

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Right: 3200  
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3700 Class  
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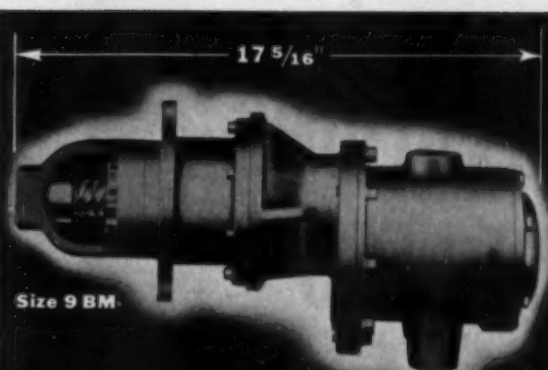
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**INGERSOLL-RAND**  
**AIR STARTING MOTORS**  
**FOR A SURE ENGINE START**  
*Every Time*

- No Batteries or Generator Necessary
- Reliable Starting Under All Conditions
- Easy to Install
- Compact—Powerful—Light Weight
- Practically No Maintenance Expense
- Proven Multi-Vane Air Motor

An Air Starting Motor is small and compact. It eliminates the need for banks of storage batteries, generators, voltage regulators and electrical devices. It will pay for itself in one year through savings on battery replacement alone!

Ask your engine distributor to show you the Ingersoll-Rand Air Starting Motors designed for your engines . . . or write for Form 5094, which contains Air Starting Motor selections for all popular engine sizes up to 3000 cubic inch displacement.

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# Here's Why INSTALLATIONS COST LESS WITH **Bendix** STARTER DRIVES

Yes, it costs less to install a Bendix\* Starter Drive, but that's only part of the story. The outstanding efficiency of the Bendix Drive has been performance proven in over 85,000,000 installations. No other starter drive approaches this record. Whatever your type of diesel, or whatever its purpose, for more dependable all-around performance it pays to specify Bendix Starter Drive.

\*REG. U.S. PAT. OFF.

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## CHECK and COMPARE THESE FEATURES

- Starting motor can be mounted more easily and in more positions.
- Requires no actuating linkage—solenoid can be placed in any convenient position.
- Simple in design—has fewer parts—needs fewer adjustments.



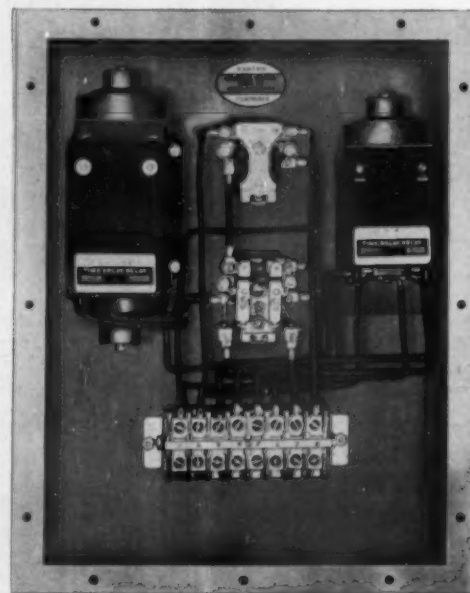
## Manager of Industrial Sales



Albert L. Hunt

National Bearing Division of American Brake Shoe Company recently announced the appointment of Albert L. Hunt as manager of industrial sales. Mr. Hunt joined the company at the National Bearing St. Louis plant in the engineering department in 1936. After experience in both operating and sales, he was appointed plant superintendent at St. Louis in 1942, and general superintendent of foundries for the division in 1952. He will continue to be located at division headquarters in St. Louis. Mr. Hunt attended Washington University in St. Louis. He is a national director of the American Foundrymen's Society.

## Automatic Engine Cranking Control



The cranking cycle of both diesel and gasoline engines can now be controlled with exacting and automatic precision with Pantro Industrial Control panels. These specially designed and engineered panels allow the engine to crank for a pre-determined interval and rest for an interval. The total number of cycles and time of intervals is adjustable. Provision is made for stopping the sequence when the engine starts. The panel can be made to start the sequence manually as well as automatically. The panel illustrated was designed by Pantro for The Buda Company, for operation from 32 volt dc., but may be had in any ac. or dc. voltage. Engine control panels are only one of many types which are custom-engineered and built by The Industrial Control Panel Company, 247 E. Illinois St., Chicago 11, Illinois. New catalog sheet will be mailed on request.

**YOUR COPY OF DIESEL ENGINE CATALOG** in its seventeenth completely re-edited, revised and expanded edition is now off the press. An invaluable aid to design engineers and buyers, it incorporates the latest diesel engine specifications and descriptions. Order your copy of this limited edition now. Profusely illustrated. \$10.00. Mail checks to DIESEL PROGRESS, 816 North La Cienega Blvd., Los Angeles 46, California.



### "FIXED-READING" PREMAX PRESSURE INDICATOR

for **DIRECT-READING**  
OF **COMPRESSION** AND  
**FIRING PRESSURES**  
OF EVERY TYPE OF DIESEL ENGINE

**ACCURATE  
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READINGS  
as high as  
1700 P.S.I.**

**ONE OF THE FEATURES  
Responsible for Its Overwhelming  
Preference by Leading Diesel  
Manufacturers and Operators**

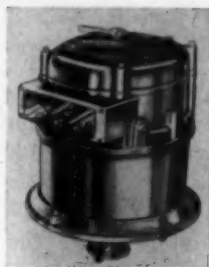
Successive readings may be taken rapidly since no venting of the instrument is required between readings. No closing of valves required to change from firing pressure to compression pressure reading.

For other features, write for  
Bulletin 294

**BACHARACH**  
INDUSTRIAL INSTRUMENT CO.  
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## New Ignition System



American Bosch Corporation, Springfield, Mass., long known for the excellence of the famous Bosch magneto and other electrical components and systems for internal combustion engines, has announced a new long-lived ignition system based on

its development of a radically new design of pulse generator, which, like the magneto, is a device for the timed firing of fuel mixtures. This new ignition system, according to Donald P. Hess, the company's president, represents a significant step in making possible substantially more efficient operation of high-compression natural gas engines. This new self-powered system, he says, is capable of producing output potentials up to 30,000 volts with extreme reliability and will allow engines to run at least six months without shutdown, even for inspection of spark plugs. The new generator is designated as the American Bosch Pulse Generator MGC. It is a comparatively large unit, approximately 11¼ in. in diameter and standing about 12½ in. above its mounting, supplying accurately timed low tension electrical pulses which are stepped up to the required spark potential by means of either single or double ignition transformers mounted on each cylinder near the spark plug or plugs. The ignition transformers are new American Bosch CLQ (single-spark) or CLP (two-spark) types designed for use with the pulse gen-

erator. They are hermetically sealed, oil filled, and have closed cores.

Reasons for the superiority of the new system over conventional systems are attributed primarily to novel features of the pulse generator. No breakers are in operation during running and no distributor is employed. Breakers are used for starting only and are automatically retracted mechanically during normal engine operation. Other unique features include the fact that at operating speeds the rotor and two ball bearings are the only moving parts. This results in exceptionally long life and trouble-free service. At cranking speeds the generator performs as a conventional large magneto. Use of breakers during cranking makes an exceptionally high voltage spark available.

The magnet rotor is a built-up assembly consisting of a single large Alnico V magnet with laminated pole shoes. Balance is accomplished by a suitable counterweight. Two heavy duty fully sealed ball bearings support the rotor, which is provided with 16-tooth 20/40 pitch external involute spline at the drive end and a single dwell hardened steel cam at the breaker end. The laminated stator assembly is positioned between a flanged cast iron drive end housing and a cast iron rear housing. The breaker plate is mounted on the rear housing. The individual coil leads are carried to a terminal plate. The breaker lift plates are retracted from the cam by a control plate actuated by an arm mounted on the breaker cover. A spring return holds the breakers in the "inoperative" position for normal running. Either gear or coupling drive may be used.

## DIESELS for operating ECONOMY

The present day trend toward diesels — both for new installations and for replacements — is largely due to operating economy and dependability.

Current installation practice is to mount them on Korfund Vibration Isolators.

This makes it possible to install diesels anywhere with positive assurance that there will be absolutely no transmission of objectionable vibration. Additional benefits include savings from reduction of building and engine maintenance costs, and frequently the elimination of concrete foundations.

Vibration is absorbed by steel springs which provide the finest isolating medium available. Thrusts are controlled by resilient checks in the four corners.

The result is smoothed, floating operation at all speeds — in marine, mobile, or stationary installations. The cost is low. Ask for Bulletin G-104. Representatives in principal cities.

**The Korfund Company, Inc.**

48-20B 32nd Place, Long Island City 1, N. Y.



Fairbanks-Morse 450-hp. Unit at Floyd Bennett Field, Brooklyn, N. Y. Foundation located above ground because of high water table. Four Korfund isolated Nordberg 1425-hp. units were recently installed by Bangor Hydro-Electric Co., in Maine.

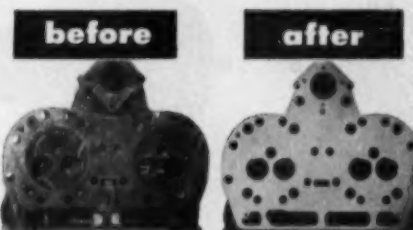
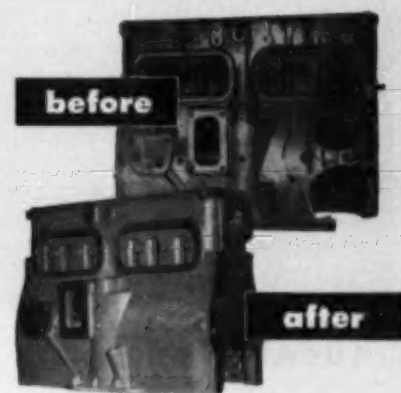
### A Few Typical Installations:

Bangor Hydro-Electric Co., Bangor, Me.	6 1425-hp. Nordberg
Lenox Hill Hospital, New York	1 750-hp. Worthington
2 Park Avenue, New York	4 450-hp.; 1 750-hp. Worthington
New Yorker Hotel, New York	1 530-hp.; 1 750-hp. Bosch-Sulzer
Mann Department Store, Brooklyn	4 300-hp.; 1 180-hp.; 1 150-hp. Worthington
Macy's, New York	1 700-hp. Also
Floyd Bennett Field, New York	1 450-hp. Fairbanks-Morse
Prudential Insurance Co., Newark, N. J.	1 740-hp. Baldwin
Lone Star Gas Co., Dallas, Texas	4 250-hp. Ingersoll-Rand (Gas)
Sun Oil Co., Marcus Hook, Pa.	1 400-hp. Cooper-Bossomer (Gas)
Cia Central Argentina De Electricidad, Buenos Aires, S. A.	1 270-hp. Sulzer; 2 540-hp.; 1 540-hp.; 1 700-hp. Boats

## KORFUND for operating SMOOTHNESS

## YOU SAVE THE DIFFERENCE

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Save the cost of new castings. Get your equipment back into service quickly with less expense. Send your broken Diesel heads, blocks and castings to Guth for *guaranteed renewal* by the Guth Fusion Process. Backed by 25 years of successful use, the Guth Fusion Process is a scientifically correct, specialized system of completely reconstructing damaged or worn castings . . . restoring them to new or better than new condition, conforming with the latest factory specifications. Every Guth renewal job is *completely guaranteed*. Ask any user — or write today for illustrated catalog. Dealerships open in some areas . . . full information on request.



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Over-all combustion



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## Florida Diesel News

By ED DENNIS

THAILAND bound is the fishing trawler *Assault* with the inscription "From The People of The United States to The People of Thailand" on its bow. Specifications are: 6-71 GM 200 hp. diesel, Twin Disc clutch, 3:1 reduction gears, 40x28 propeller, 10 knots, fuel consumption is 4 gal. per hr. and a 1200 mile range. Outfitted at the Miami Shipbuilding Corp. yards.

REPOWERED with GM 6-71's from gasoline engines, the twin screw yacht *Rover* of Boston. Twin Disc clutch, a 4-cyl. Hercules 25 kw. diesel for lights, etc., owned by Chamder Hovey who formerly raced in the Lipton Cup events.

THREE Fairbanks-Morse 10 cyl. opposed piston type diesel engines, 1600 hp. at 720 rpm., hooked to three F-M pumps for use in the Everglades Flood Control.

TWO CUMMINS diesels model NHMRS for the yacht *Blue Jacket* of New York. Twin Disc clutch, Fulton Sylphon safety controls. Installed at the Miami Shipbuilding Corp.

SNOW NABSTEDT Gear Corp. in conjunction with their Miami distributor, J. Frank Knorr Co., held a service school for their South Florida customers, which was followed by a luncheon at the Saratoga Inn. Represented were Henry A. Pohl, Inc., Gray Diesel, Miami Marine Engineers, Kermath, Cummins, Diesel Engines of Florida, Gibbs Corp., J. Frank Knorr, Enterprise & Waukesha, and Shelley Tractor Co.

ELEUTHERA, B. W. I. for the guided missile base—4 model D364 Caterpillar 225 hp. diesels, Allis Chalmers 150 kw. generators, one of the islands which make up a chain of bases throughout the Bahamas.

ATLAS marine 600 hp. diesel model 45-M5X-8 for the first of 28 navy tugs being built at Smith's Basin and Drydock, Fort Lauderdale, under a \$296,350 government contract. Capitol 2.5:1 reduction gears, 4 blade Columbian propellers, 2 Fairbanks-Morse model D325 air compressors and a 10 kw. Hercules diesel for lights, etc.

CUMMINS diesel delivered to the Miami Crushed Stone Co., a 4 cyl. Cummins diesel 110 hp. at 1800 rpm., Twin Disc clutch and an Allis Chalmers 8x6 solid handling model H.R.I.P. pump for reclaiming work.

PERU, S.A. bound are 3 Waseo road scrapers with 4 cyl. International Harvester diesels; 2 Allis Chalmers tractors HD 14 with GM 6-71's; 2 D8 Cats; 1 TD18 International Harvester tractor; 1 D4 Caterpillar tractor and other dieselized equipment sold and shipped by Auto Marine Engineers of Miami.

THE *SIROCCO* repowered with 2 GM 6-71 diesels; power for the freezing compartments and auxiliary power with 2 GM 2-71 Delco generating sets; owned by Gulfpac of Fort Myers Beach.

AT KEY WEST the Thompson Enterprise installed a 120 hp. Fairbanks-Morse diesel with a 10x10 45-ton York refrigerator compressor, plus two GM 6-71's for other purposes.

3 CHICAGO PNEUMATIC diesels model 89-CP 8 cyl., 350 hp. at 720 rpm. and 2 Caterpillar powered cement mixers for Turk Island, B.W.I.

FROM GENERAL Engine & Equipment, Tampa: a GM 6-71 with GM clutch and 3:1 reduction gears for the Tarpon Springs boat *Aspasia* and a 4-71 GM to repower a Koehring dump truck at the Florida Rock Products Co.

CUMMINS DIESEL at Tampa reports another model JBS 600 Cummins 150 hp. in a Diamond T tractor for the Cone Bros. Construction Co. This firm with over 200 pieces of construction equipment is switching to an all diesel fleet as fast as the engines can be obtained.

A LATHROP diesel for the shrimp trawler *Silvia G* model DH 200, Capital clutch, 3:1 reduction gears, Surette batteries, 44x34 Columbian propellers, a complete "package unit" from Marine Motor Sales Corp., Jacksonville.


NEWLY launched shrimp trawlers, *Cap't. Mitch*, *Fernandina* and *Kimberly*, Fort Myers Beach; both with GM 6-71 diesels and GM hydraulic marine gears and power take-off, Barnes and Goulds pumps, Donaldson air breathers; at Diesel Engine Sales of St. Augustine.

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## Forms Foreign Trade Subsidiaries



Michael C. Pollock

The formation of two wholly-owned subsidiary companies has been announced by Gordon Lefebvre, president of The Cooper-Bessemer Corporation, Mount Vernon, Ohio. Known as Cooper-Bessemer International Corporation and Cooper-Bessemer Overseas Corporation, the new companies serve as exclusive export sales distributors for Cooper-Bessemer engines and compressors. Cooper-Bessemer International will handle all sales of the company's products in the Western Hemisphere outside the United States. Cooper-Bessemer Overseas will be responsible for sales to the rest of the world. The companies were formed to facilitate expansion of Cooper-Bessemer's export market, to maintain closer control over foreign sales policies, and to provide more effective service for C-B customers outside the United States.

Both companies are headed by Michael C. Pollock, with a staff of assistants, located at 25 West 43rd Street, Suite 1112-13, New York, New York. Cooper-Bessemer engines and compressors are presently used by petroleum and chemical companies throughout the world for industrial processes, for transmission of crude oil and its products, for generation of electric power, for all marine applications, for diesel-electric locomotives, for power shovels, drag lines and dredges, etc. Present plans provide for Cooper-Bessemer International offices in Caracas, Venezuela, Sao Paulo, Brazil and Mexico City, Mexico.

## Honor Champion Truck Driver



C. R. Boll, general sales manager, Cummins Engine Company, Inc., Columbus, Indiana, here presents Harry Naylor, Signal Trucking Company, Ltd., Los Angeles, the Cummins trophy following Mr. Naylor's victory at the 1952 truck-and-full-trailer National Rodeo championship. The finals were held recently in New York City during the American Trucking Association's convention. Cummins has made the award annually since 1940 to inspire greater skill and safety in the operation of heavy-duty trucks. In addition to receiving the huge, four-foot trophy, Mr. Naylor and his wife spent a day as guests of Cummins Engine Company at Columbus, Indiana. While in Columbus, the Naylor family were entertained by Cummins officials, honored at a special luncheon, and escorted on a plant tour.

## Test Stand

A diesel engine test stand in use at the Charleston Naval Shipyard makes it possible to test blowers under simulated shipboard operating conditions, discover oil leaks and overheating before blowers are installed in the ship. The stand was designed and built on the yard, fitted with 165 hp. diesel. Blowers under test are designed to operate under three to six pounds back pressure for approximately six hours.

## Flexonics Bulletin

A new two-color bulletin on RT-6 and RT-8 flexible metal hose, the "all purpose tubing and duct-

ing," has just been released by Flexonics Corporation, Maywood, Illinois. This bulletin gives full specification data on these popular types of Rex-Tube, used in such varied applications as ventilating ducting, refrigeration tubing, and automotive exhaust. For a copy write Flexonics Corporation, 1325 South Third Avenue, Maywood, Illinois, designating bulletin CMH-115R.

## Division Sales Manager

Farr Company of Los Angeles, manufacturers of air filters and air filtration equipment, has announced the appointment of John S. Powell as division sales manager supervising the Central Division.

## TODAY'S GIANT

# DIESEL VALUE!

## D-X DHD MOTOR OIL with EXTRINOL

For big jobs and rugged jobs, Diesel operators choose the giant motor oil value—D-X DHD Motor Oil with Extrinol. It stands up longer under all conditions. It lubricates better. And it's *guaranteed!* Try it in your Diesels.



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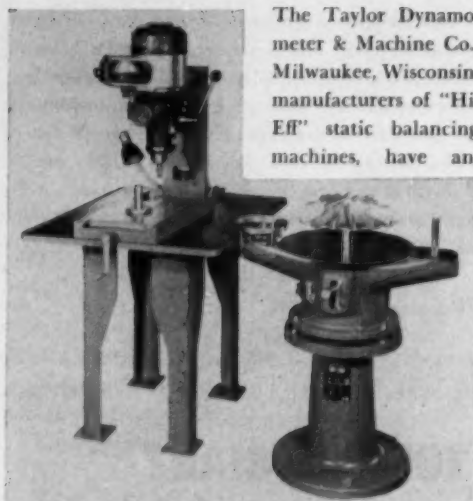


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## Corrective Balancing Device



The Taylor Dynamometer & Machine Co., Milwaukee, Wisconsin, manufacturers of "Hi-Eff" static balancing machines, have an-

nounced that they are now in production on a simplified and inexpensive unit for milling operations that are required to make corrections on piece parts that are to be put in balance. According to A. C. Flamme, Taylor Co. executive, the unit was developed because of a long standing demand for a simplified method of correction by milling where removal of weight was required and drilling was not feasible. The Taylor arrangement consists of a milling attachment mounted on a sturdy, ground work table with coolant trough. The fixture for the piece part to be corrected is mounted on ways and moved against an end mill in the milling attachment. A manual feed screw with a graduated color for measurement of stock removal provides for a quick and simple operation. This simple arrangement for correction of out of balance parts is fast, handy and inexpensive. It is designed for use with the Taylor "Hi-Eff" balancing machines.

### Nordberg Distributor

Appointment of Huckabee, Inc., Sewickley, Penna., as marine and industrial distributor for Nordberg Type 4FS Diesel engines in western Pennsylvania and northern West Virginia is announced by Nordberg Manufacturing Company, Milwaukee 1, Wisconsin. Huckabee, Inc. was established in 1945 to service the river trade and industrial accounts in the Pittsburgh area. Mr. Walter G. Huckabee, president, was a chief engineer for many years on vessels of the Union Barge Line and he holds an unlimited chief's license. Following its organization, the firm grew quickly and now occupies a spacious building at 10 Chadwick Street in Sewickley (a suburb of Pittsburgh). Currently, the firm employs nine men and has complete machine shop facilities. It is equipped to expertly handle all types of diesel repair and electrical work and to service the marine and industrial trade in the Pittsburgh trade area and Ohio River Valley.

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George W. Codrington, Vice President General Motors Corporation and General Manager of the Cleveland Diesel Division—and your sad faced editor—Rex W. Wadman.

### URNS OVER MANAGEMENT REINS

A few days after this photograph was taken in Mr. Codrington's office in Cleveland, he turned over the reins of management of the Cleveland Diesel Division to Thomas E. Hughes, on December 31st to be exact. The inexorable march of time plus the Corporation's orderly and planned system of retirement brought about this efficient transfer of managerial responsibilities.

I know of no man better fitted to take over the operating of so important a Division of the Corporation than is Mr. Hughes. For twenty years Tom Hughes has been working under George Codrington. He has worked up from the bottom and has been well trained for this big job. He knows the business and he knows the customers. He has a fine personality, is likable, hardworking and has a brilliant mind. The Cleveland Diesel Engine Division, as always is in good hands.

The reason your editor has such a long, sad face

in this photograph is that George W. Codrington is his oldest and closest friend in the industry. I'm just sentimental enough to feel the impact personally of this steady, inflexible march of time.

I first met George Codrington back in 1912. We have been close friends for forty years and have worked together in this engine business, first as competitors (I sold engines for about ten years), then as his advertising agent, and later, when I got into the publishing business, he became and remained my most consistent advertiser.

We have seen the engine business go up and go down. We've had our individual ups and downs. It has been a grand friendship with plenty of give and plenty of take on both sides. Best of luck to you George. I know you won't quit work. Wherever you are or whatever you do, you'll be stirring things up.

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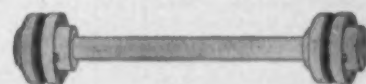
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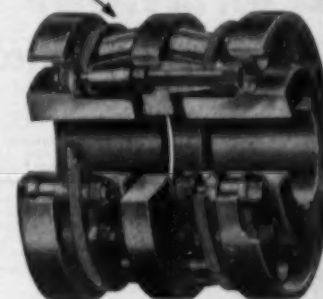
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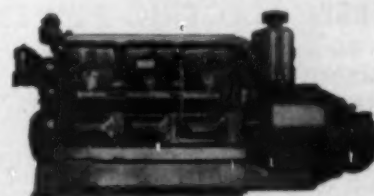
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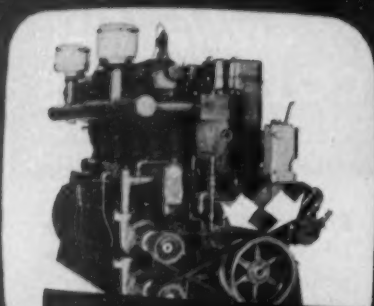


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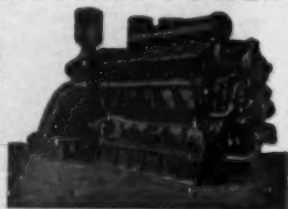
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## West Coast Diesel News

By **FRED M. BURT**

FOR USE at their new underground gas storage field east of Whittier, Calif., three 440-hp. Cooper-Bessemer natural gas engine driven compressors, for Pacific Lighting Gas Supply Co., of Los Angeles.

INSTALLED AT Tulare, Calif. for Gordon H. Ball and San Ramon Valley Land Co., a new 4,000 lb. batch type asphalt plant from Madsen Iron Works, Arizona contractor; mixing plant powered by a 165-hp. Murphy diesel; the dryer by an 85-hp. Cummins, and dust collector by an 80-hp. Caterpillar diesel.

THE Deakins-Lane Diesel Co., 680 Highway 80, El Cajon (San Diego), has been appointed as dealer to handle sales and service for San Diego and Imperial Counties, by Anderson-O'Brien Co., Los Angeles, distributors for General Motors Detroit diesels. Jack Deakins was formerly in executive sales capacity for the GM Detroit Diesel Division.

FOR THE Pacific Gas & Electric Co.'s new pipeline from Arizona to San Francisco, at the Kettleman Station near Coalinga, Calif. four 1760-hp. natural gas engine driven Clark Bros. compressors.

TO COMPLETE dieselization at Inspiration (Ariz.) Copper Corp., a third General Electric, 70-ton switcher locomotive; power from GE generator driven by a 660-hp. Cooper-Bessemer diesel engine.

FOR Dicalite Div. of Great Lakes Corban Co., Los Angeles, a 75-kw. diesel-electric set (with 120-hp. Caterpillar diesel) to take up the 10% power shortage at their Terrebone, Oregon diatomaceous earth mill.

PURCHASED BY Volcanic Cinder Co., Montebello, Calif., two Peterbilt trucks with large, special hopper type bodies, each powered by 215-hp., 6-cyl. Buda diesel engines.

FOR USE in gas line pumping by Union Oil Co. at their Fullerton, Calif. field, two 330-hp. natural gas engine driven Cooper-Bessemer compressors.

AT THE HUGE new Columbia Broadcasting System TV and Radio Center, Los Angeles, for standby power, a 100-kw. Delco generator driven by a 165-hp. General Motors diesel.

PURCHASED FROM Bethlehem Supply Co., Los Angeles, three 350-hp. Waukesha natural gas engines each driving a 100-kw. Electric Machinery generator to supply auxiliary power and lights for Pacific Lighting Gas Supply Co. at their new station east of Whittier, Calif.

TO SUPPLY power for Gargan Engineering Company's tungsten mill, Wadsworth, Nev., from Engine Sales & Service, Los Angeles, a 165-hp. Murphy diesel driving a 100-kw. Electric Machinery generator.

A NEW 660-hp. Cooper-Bessemer gas compressor is being installed at Ventura, Calif., for their gasoline plant operation.

IN DEATH VALLEY at the Stovepipe Wells resort hotel, a 4-cyl. 110-hp. Cummins diesel driving a Palmer 40-kw. generator, has been installed to provide light and power.

TO PROVIDE emergency power for heat treating furnaces at the Norris-Thermador Army Ordnance plant at Riverbank, Calif., seven 100-kw. Delco generators driven by 165-hp. Buda natural gas engines (converted for use of propane); also a similar Delco 50-kw. generator and 85-hp. Hercules engine combination.

RUSSELL LOWRY and Frank Woodward, previously outstanding field sales and service representatives for General Motors diesel engines, are now operating Gem Equipment Company, 1665 N. Ventura Ave., Ventura, Calif., as GM dealers, to provide the same excellent service in that area, sponsored by Anderson-O'Brien Co., GM distributors in Los Angeles.

RECENTLY RETURNING from a five weeks trip calling on his company's distributors in Central and South America, Wm. D. Brumbach, vice president of Hallett Mfg. Co. reports that the situation is improving in relation to purchase of American diesel engines. They are preferred, but the dollar-shortage, restricting exchange, has been heavily in favor of European diesel manufacturers.

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LARGEST CRANKSHAFT GRINDER IN A JOBBING SHOP



### Assistant to Vice-President



Richard T. Karr

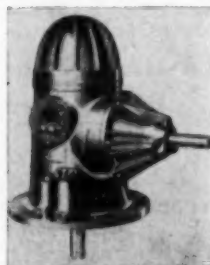
Richard T. Karr, formerly a sales engineer in the Detroit office of Purolator Products, Inc., manufacturer of automotive oil filters and other filtration equipment, has been appointed assistant to the vice-president in charge of sales, Carlos D. Kelly, vice-president, announced recently. Mr. Karr, who will make his headquarters in Rahway, has been with Purolator since 1937, and prior to wartime service in the Air Corps, was for several years in the engineering department, where he participated in development of the company's line of aircraft filters. His new duties will be concerned with sales of filters and refills to automobile, truck and farm equipment manufacturers, for installation as original equipment.

### Beat Delivery Schedule by Six Months

The first two of 32 Baldwin-Westinghouse diesel-electric locomotives ordered last winter by Central Railways of Brazil have been delivered six months ahead of schedule, the Westinghouse Electric International Company announced recently from its New York headquarters. Five times more powerful than the first Baldwin-built locomotives delivered to the railroad 90 years ago in 1862, the two 1,600-hp. units weigh 170 tons each and exert a continuous tractive effort of 72,900 pounds. The three steam locomotives placed in service 90 years ago weighed only 29 tons and boasted a tractive effort of 13,420 pounds.

The railroad will receive twelve 170-ton units that will operate on broad gauge (63-inch) track, and twenty 118-ton units designated for meter gauge (about 39 inch) track. The shipment is part of Central Railways' current program to extend diesel-electric operations to key sections of its lines, which provide service between Rio de Janeiro and Belo Horizonte and to the surrounding area. Replacement of the present steam locomotives is expected to reduce operating costs even though fuel oil must be imported. The Baldwin-Lima-Hamilton Corporation, Eddystone, Pa., is building the mechanical parts and assembling the locomotives, for which Westinghouse is manufacturing complete electric traction units at its East Pittsburgh, Pa. plant. Delivery of all 32 units is scheduled for completion by the first quarter of 1953.

### Right Angle Gear Drive



Of great interest in power plants is the new Johnson right angle gear drive which offers a wide application as a "connecting right-angle unit" of power transmission for various types of processing equipment. The Johnson drive makes possible more compact installations eliminating belt transmissions and permits greater production capacities with economy

and efficiency, and is adaptable with either vertical or horizontal prime movers. The right angle gear drive meets the difficult conditions of exposed operations as the unit is completely dust and weather proof. Installations are varied for gasoline, natural gas, steam, diesel or electric motive power from 15 hp. to 450 hp., and requires only a minimum of maintenance. These factors together with a wide selection of types, sizes and ratios, plus the drives' adaptability in dual, multiple or combination operation, offers a comprehensive range for effective production uses in the power industry. Full details with specific application, literature and engineering data supplied on request. Address: Johnson Gear & Manufacturing Co., 8th and Parker Streets, Berkeley 10, California.

### Increases Abilene Staff

The appointment of three new service men to the Abilene branch of Stewart & Stevenson Services has been announced by Joe Manning, Stewart and Stevenson vice president and general manager. They are N. L. (Red) Warren, S. M. McNeely, and N. L. Fincher. With the addition of these men, the Abilene branch will be able to greatly improve its service and cut down time in handling repair calls. This brings the Abilene staff up to four men including C. A. (Chili) Weathered, manager. All Stewart & Stevenson service men are thoroughly trained at specially conducted GM diesel service schools at the Houston plant before being assigned to branch offices.

## Getting the Inside Story of ...

### The most important moment in your Diesel's life

A blinding flash—a split-second explosion—in this momentary span of time in which combustion takes place in your Diesel, raw fuel is converted into power. Lanova research into this combustion phenomena has led to the development of the Lanova Combustion System as a successful answer to improved combustion characteristics in the modern high-speed Diesel. Through the years, the system has been constantly improved by Lanova engineers. Their untiring efforts have led them to explore many fields allied to Diesel operation and have resulted in the development of new and improved techniques and equipment, many of which are being made available to industry. Small wonder that Lanova has acquired distinction as a leader in advanced research and development.

#### GET THE LANOVA COMBUSTION STORY

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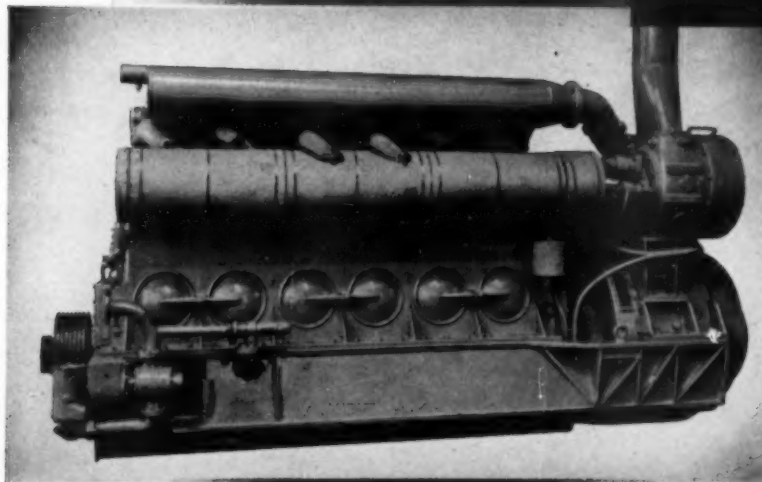
## ADVERTISERS' INDEX

A. B. Hydrocarbon Systems.....	82	Kato Engineering Co.....	84
Adeco Products, Inc.....	80	Korfund Company, Inc., The.....	79
Aerofin Corporation.....	73	Lanova Corporation.....	85
Aeroquip Corporation.....	4	Lewis Company, Warner.....	61
Air-Maze Corporation.....	20	Lubaid Company.....	80
American Air Filter Co., Inc.....	6	Marley Company, Inc., The.....	28
American Locomotive Co.....	19	Mid-Continent Petroleum Corp.....	81
American Motors Co.....	88	Murray & Tregurtha, Inc.....	60
Bacharach Industrial Instrument Co.....	78	Nordberg Mfg. Co.....	11
Brodie System.....	81	Pennsylvania Flexible Metallic Tubing Co., Inc.....	57
Brown & Sharpe Mfg. Co.....	77	Petrometer Corp.....	82
Brush Aboe, Inc., Petter Engine Div.....	59	Pickering Governor Co., The.....	77
Buda Company, The.....	15	Pierce Governor Co., Inc., The.....	66
C.A.V. Ltd.....	76	Purolator Products, Inc.....	22
Cities Service Oil Co.....	63	Quincy Compressor Co.....	68
Cleveland Diesel Engine Div., General Motors Corp.....	21	Schoonmaker Co., A. G.....	84
Columbia Electric Mfg. Co.....	80	Scintilla Magneto Div., Bendix Aviation Corp.....	18
Cooper-Bessemer Corp.....	Fourth Cover	Shrier & Sons Co., A.....	82
Cummins Engine Co., Inc.....	25	Sinclair Refining Co.....	8
DeLaval Separator Co., The.....	5	Skinner Purifiers Div., Bendix Aviation Corp.....	66
Detroit Diesel Engine Div., General Motors Corp.....	2-3	Standard Oil Co. of California.....	13
Eaton Manufacturing Co.....	72	Standard Oil Co. (Indiana).....	17
Eclipse Machine Div., Bendix Aviation Corp.....	78	Synchro-Start Products, Inc.....	66
Electro-Motive Div., General Motors Corp.....	10	Texas Co., The.....	Second Cover-1
Elliott Company.....	Third Cover	Thomas Flexible Coupling Co.....	83
Enterprise Engine and Machinery Co.....	9	Titeflex, Inc.....	24
Erie Bolt & Nut Co.....	69	Torcon Corporation.....	70-71
Erie Forge & Steel Corp.....	14	Tuthill Pump Company.....	84
General Motors Corp.....		Union Diesel Engine Co.....	62
Cleveland Diesel Engine Div.....	21	U. S. Hoffman Machinery Corp.....	82
Detroit Diesel Engine Div.....	2-3	Van Der Horst Corp. of America.....	82
Electro-Motive Div.....	10	Westinghouse Electric Corp.....	26
Guth Company.....	79	Worthington Corporation.....	23
Harnischfeger Corp., P & H Diesel Div.....	7	Young Radiator Co.....	16
Honan-Crane Corp.....	75		
Ingersoll-Rand.....	77		
International Harvester Co.....	12		
Interstate Diesel Service, Inc.....	82		
Interstate Training Service.....	88		

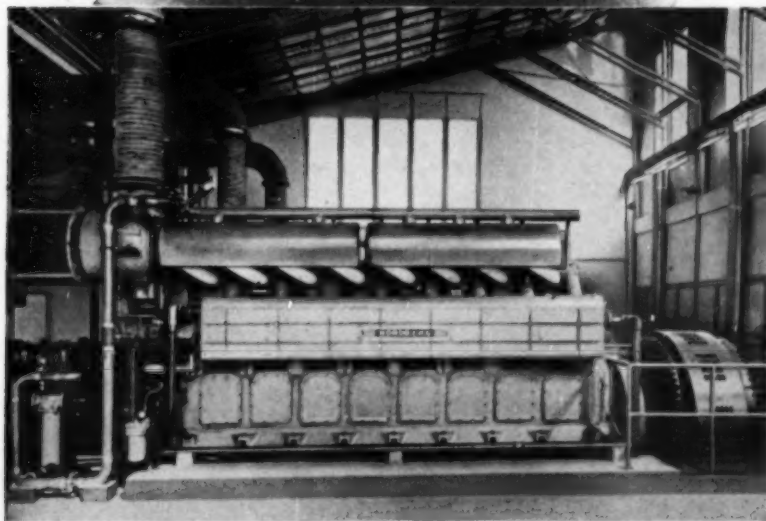


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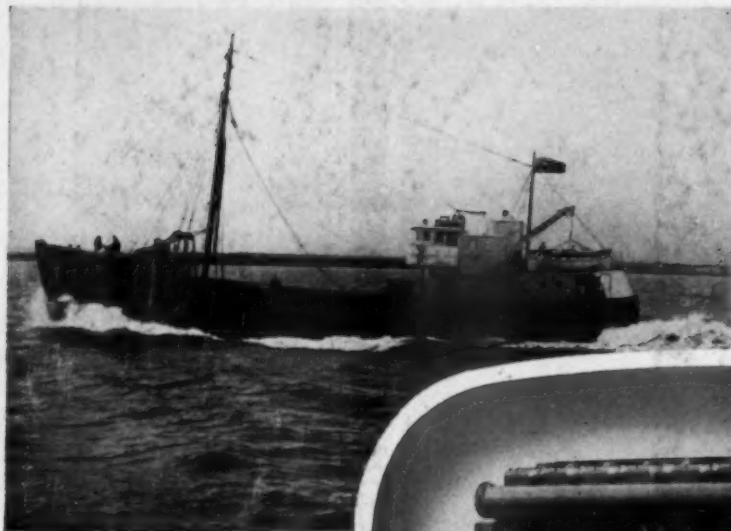
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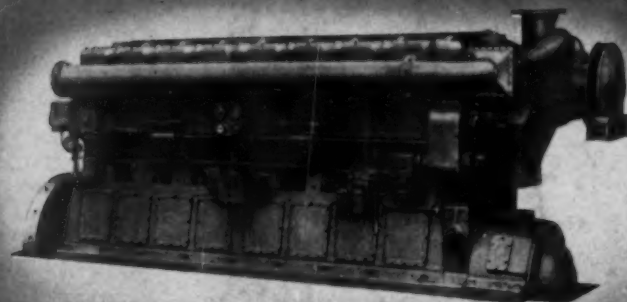
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